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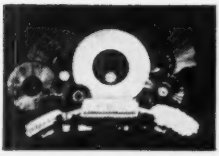

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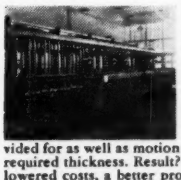

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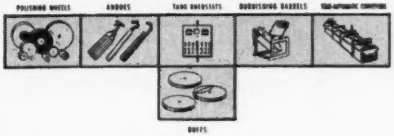

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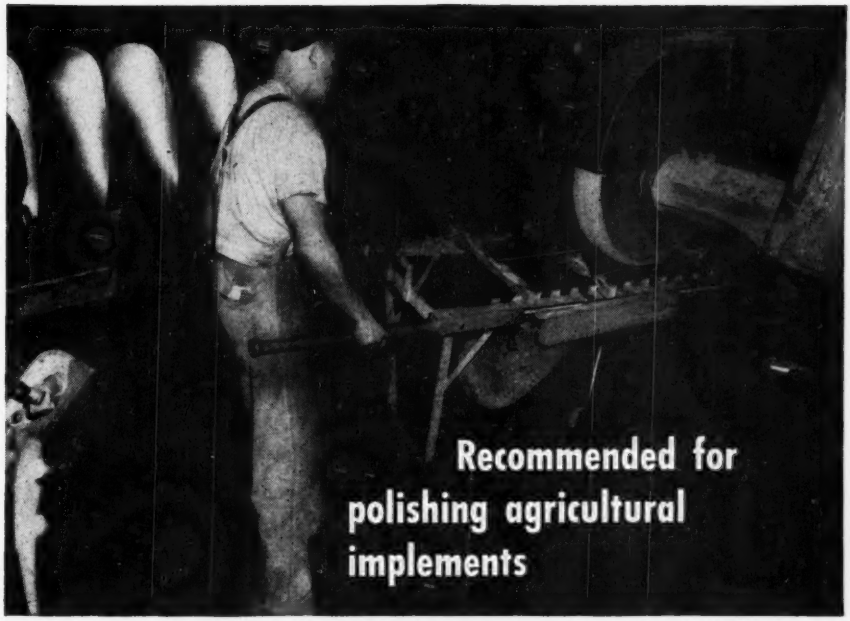

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Pf editorial

Vol. 15, No. 2

NOVEMBER, 1950

Open Your Doors!

There is a growing realization by business and industry of the value of encouraging the public to visit industrial plants. By no other means can individual citizens obtain an accurate picture of what industry is like.

There are many ways of accomplishing the desired result, as well as a variety of benefits that may be obtained from such visits. The "Open House," a special occasion upon which families of employees or other special groups are conducted through the plant, is now a firmly established practice in many companies. Upon occasions such as the dedication of a new or unique manufacturing unit, or a new research laboratory, representatives of the trade and business press are shown through the facilities, so that the facts on the new developments may be disseminated more rapidly to the entire industry as well as to the general public.

The manager of one large plant makes it a practice to show his grocer, his minister, and as many of his neighbors as possible through his plant, so that individuals in many walks of life can form and pass along a correct impression of present-day manufacturing. Members of technical societies and groups are frequent visitors to plants in their respective fields.

Realizing that school teachers need accurate information about local industries, the Chambers of Commerce in many cities sponsor a Business-Industry-Education Day, on which groups of teachers are conducted through key plants and thus receive first-hand information about the business. In Cincinnati, for example, 2,000 teachers were recently conducted through 100 plants in the first B-I-E Day program. Throughout the nation, 50,000 educators have participated in similar programs.

The first benefit to industry in general and each local plant in particular, resulting from plant visitation programs such as those mentioned, may be generalized as improved public relations. More specifically, the families of employees, and the local citizens as well, cannot help but have a better feeling toward industry when they know more about it. Best of all, perhaps, is that when employees see visitors so much interested in their company, the company takes on new importance in their eyes, becomes more than just a place to work, and the first step in the development of industrial team spirit has been taken.

Those of us who have fought the battle of production know what tours cost in terms of lost productive man-hours. The concensus of opinion is that they are worth the money.

Ezra A. Blount

Unique Conception of

By WALTER RUDOLPH

THE Ervite Corp., Erie, Pa., one of the leading job enameling plants in the country, is unique in plan and construction. In the present unit unusual materials handling equipment and jobbing technique are proving particularly successful.

In order to achieve the best results in a job enameling plant which has an eye on the future, Ervite engineers studied carefully for progressive construction of a building to employ enamel techniques comparable to the largest plant in the country. The present Ervite plant serves for all operations except stamping and fabrication, which are sub-contracted. Stampings are enameled in an essentially box-furnace operation, although some experimental work is being conducted

Fig. 1 (left)—This illustration shows one of four air-operated walking beam type lifts in use in the Ervite plant, with work-carrying buggy nearing the end of the lift 18 inches above the normal plant working level.

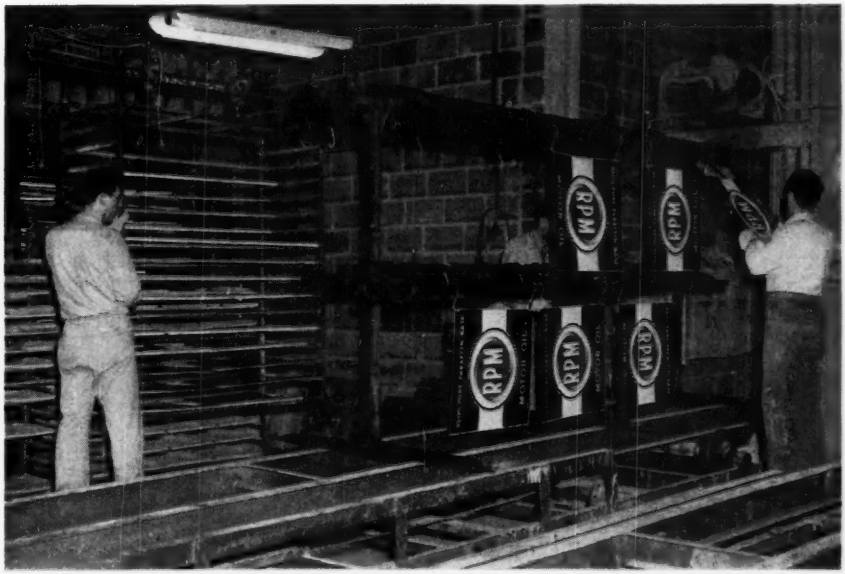
Fig. 2 (right)—Operators unload work hangers which have just been removed from a gas-fired furnace and place the work pieces on the buggy at the left. Operators work on platforms which are level with the furnace work beds and with the buggy on the high-level monorail.

Job Enameling Plant

continuously as part of the laboratory control setup that will grow with plant expansion.

In an effort to avoid the pitfalls known to most job enamelers, Ervite carefully considered factors which stymie production in all industrial endeavors. Unnecessary handling of work pieces resulting from side-tracked ware presented the most difficult problems; consequently, materials handling methods were given careful consideration. It was decided that compactness was important, under the theory that with unused space held to a minimum, less room exists for the excess accumulation of job lots which should be kept moving through the plant. This factor dictated the installation of an interwoven monorail conveyor system. This method of materials handling was decided upon because of economy of installation and maintenance and a minimum tendency to lead to the piling up of work away from the production line.

Due to the diversity of products produced by the company, Ervite was required to design a monorail buggy



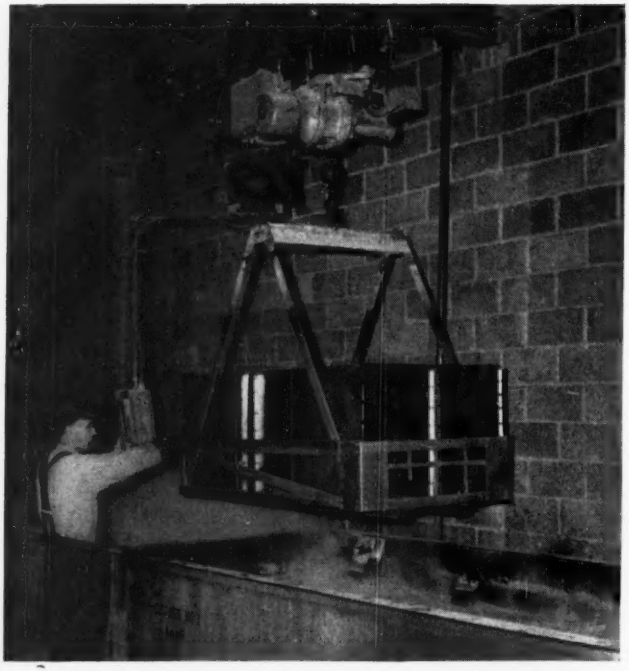


Fig. 3 — The ½-ton electric hoist used in the Ervite pickling room has unusual speed; however, to prevent accidents, it is regulated by an automatic acceleration device on the two-speed motor. Because of fumes and high humidity, the pickling room is constructed entirely of masonry and fir timber.

measuring 24 by 58 by 72 inches for use on the monorail conveyor. Fifty of these buggies were fabricated by a local concern, each unit being welded of 1 x 1 x ⅛-inch angle iron into a ribbed frame structure that is designed to hold approximately 16 layers of removable wood slats, each slat measuring 60 by 2 by 1½ inches. The buggies are each suspended to within about one foot of the floor by two wheels that fit over the monorail. Between 600 and 700 feet of monorail were installed, the aim being to provide for straight production flow with the exception of two short storage lines in the furnace area and silk screening area.

The buggies are designed to hold approximately 500 pounds. Product sizes usually range from 4 by 7 inches to 3 by 4 feet and weights from several ounces to around 100 pounds.

On the average, there are some 15 different kinds of work traveling on the monorail at one time. This and the other factors of job enameling make the wood slat and buggy combination ideal for the monorail system of materials handling.

The Ervite system incorporates a two-level improvisation to solve a particular problem in materials handling. The problem concerned the transfer of ware from buggies to the alloy steel burning tools—hangers or points—for forking into the two openings of the 5 by 12-foot gas-fired box type furnace, which has sidewalls of sufficient height to suspend a 72-inch piece of work straight down at the center.

The hangers travel out of the furnace on forks that are about 2 feet above plant floor level. Ervite had to provide some method of locating the monorail buggies and operators on a comfortable working level with the furnace hangers when withdrawn from the furnace. Two means for solving the problem were devised. First, a ramp or platform was built around the forks, and four air-operated walking beam type lifts of the design illustrated in Fig. 1 were inserted in the

monorail system in the furnace area. The former arrangement placed the operators on a level with the forks, as shown in Fig. 2, and the latter arrangement brought the buggies within reach and lowered them back into the normal production flow.

In addition, the company built a section of monorail across the center of the fork beds so that the buggies can travel to the center of the loading and unloading area, and work is facilitated on both sides of the burning tools. Actually, the buggies are lifted only 18 inches by the air hoists; however, they operate from cylinders 49 inches in length and with 49-inch piston strokes. Such an arrangement was found to be necessary in order to keep work level on the buggies while in transit from one level to another. A standard air valve controls elevation or lowering of the buggies. Air cylinders are made from seamless tubing with a 3-inch inside and 3¼-inch outside diameter, slightly thicker than required for the plant's 100-lb. air pressure.

The monorail system is manually-powered since Ervite officials felt that the diversity of production, with the attendant variance of time and operations performed on job lots, would not lend itself to a synchronized power system that would move all ware at the same speed along the track.

In regard to the overall production setup at Ervite, receiving and shipping doors are adjacent to the pickling room area and beginning of the monorail system. Stampings are loaded directly onto special steel frame racks that rest on dollies, and these are moved manually to within reach of a ½-ton electric hoist which follows a circular

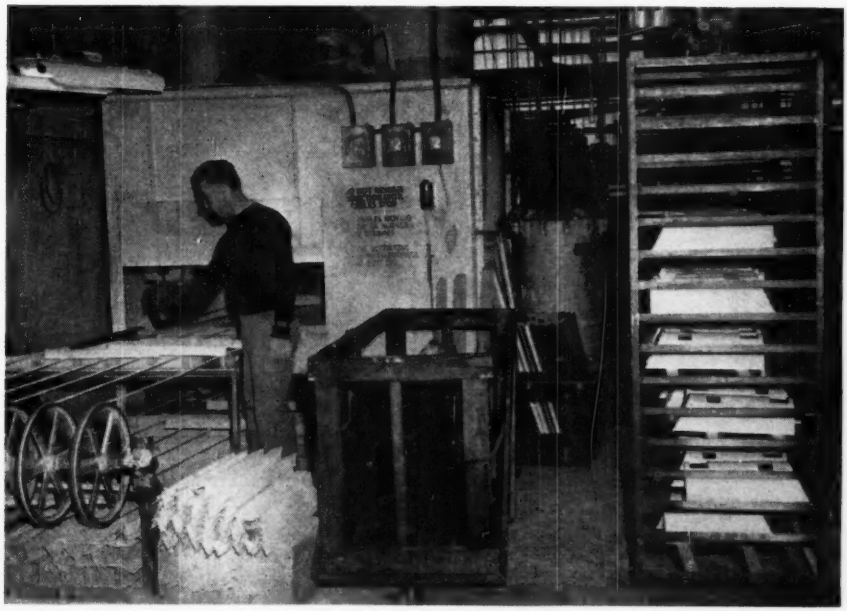


Fig. 4—This illustration provides a view of the put-on end of the reversible cable conveyor dryer, with the monorail and buggy system in action at the right. An odd lot of stove and range pieces is being sent through the spray booths on pieces of angle iron which return on the bottom cables near the operator's knees.

monorail around the ceiling of the 20 by 70 by 16-foot pickling room, as shown in Fig. 3. This room contains nine tanks, each 11 by 4 by 5 feet, with space provided for the addition of another acid tank.

Looking ahead to the maintenance of this area of the plant, management stipulated that construction materials in the pickling room be entirely of masonry and fir timber. Ventilation in this room was also given special attention. High-powered fans in one wall and at the rear of the room change about 20,000 cubic feet of air per minute. To reduce fogging during the cold months, the air is drawn from the shop itself. During the summer, louvred ventilators admit fresh air.

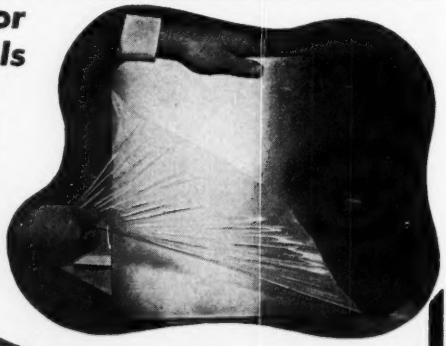
All of the non-acid tanks are gas-fired with manually-adjustable immersion type heating coils specially devised by Ervite. Heavy steel tanks contain alkaline solutions and rinses, while acid containers are of reinforced concrete with acid-resisting brick lining. The latter tanks are heated with low-pressure steam.

Some work, after pickling, remains in the special baskets or racks and is routed either to dipping or spraying stations, depending upon the size and treatment. A ground coating method was performed on a merry-go-round dipper at the far end of a reversible cable conveyor dryer; however, this piece of equipment has been moved to the head, or the loading end, of the dryer line, as shown in Fig. 4, so as to reduce the amount of labor required to transfer the dipped ware from one end of the dryer to the other.

Two 6-foot spray booths are located over the loading end of the dryer line, as shown in Fig. 5. Reclaiming is effected in hopper bottoms with swivel outlets for draining to tubs or waste. Ervite's work calls for these high-dry type booths to be used for both ground and cover coats, reinforcing, black-edging, and white; consequently, hose connections are utilized for quick wash

A Strippable Plastic for the Protection of Metals

Striplastic is a protective plastic applied by spraying, dipping or rolling. It is used on stainless steels, high polished metal sheets, sheets in cold working or drawing, tools, dies and parts, and on sheets or metal parts before packaging. It protects against scratching and abrasion, and against rust. Also available as a booth coat protection.



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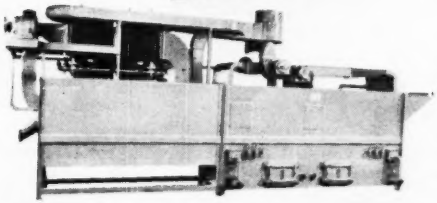

SMALL cartridge cases will be more efficiently washed, rinsed and dried in this Alvey-Ferguson Washing Machine because of the A-F Super Spray and Super Dry systems. Other Alvey-Ferguson machines are built for soaping and drying cartridge cases.

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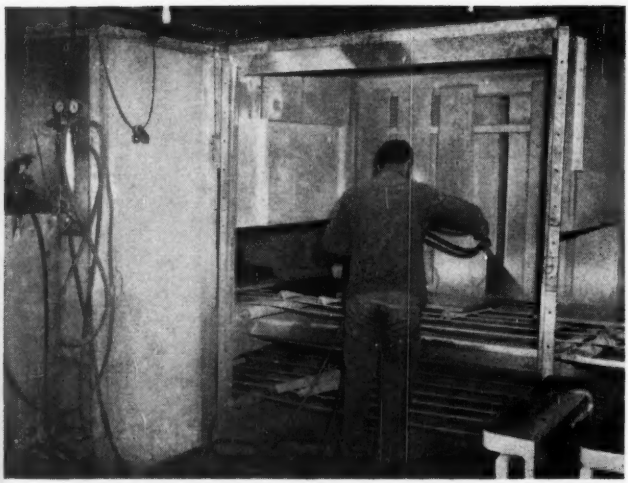

Fig. 5—This illustration shows the details of one of two high-dry spray booths employed in the Ervite plant, each booth being located directly over the reversible cable conveyor dryer. Enamel reclamation and ventilation facilities are provided.

downs and maintenance of reclaimable enamel in a fluid state.

A 4 by 4 by 30-foot cable dryer is also used for all ground and cover coats and is custom-built and gas-fired. The cable conveyor was chosen for its all-around utility, as, for instance, in the case where the company used enameled angle stands for supporting ware on the cables. These stands are returned to the loading end of the line simply by dropping them through at the take-off to the lower returning cables.

Upon removal from the dryer, work travels on the aforementioned monorail buggies to brushers, or the silk screen department, where the latest methods in this kind of work are practiced. From here the work is conveyed to the furnace and then to the inspection department.

Most of the inspection can be accomplished while the ware remains on the buggies. A simple expedient is then used for the movement of material on to the shipping department and/or beyond to the head of the cable dryer for reworking.

If ware is defective, it is merely turned over on the buggy slats, and, as it passes to the shippers, they let it remain on the buggy. The defective work then moves on down the monorail as described above, where is it forced into the regular production schedule, or if not in large enough quantity to warrant a change in the current procedure, it is piled until enough pieces are accumulated to wedge into other operations.

It should be noted, too, that Ervite attempts to coordinate the arrival of job lots at the shipping area, through inspection, with specific truck movements. The truck to be used in transporting the finished work is backed up to the door of the shipping department, its body on a level with the plant floor, and is loaded with hand trucks. When operations run smoothly, shippers remove ware from the passing buggies, place it in packing boxes, hand-truck the boxes into the semi-trailers and the shipment is moving.

Ervite is especially proud of its control setup for the mills and the laboratory as the company has exercised considerable care to make this phase of the work far-reaching in the stabilization of operations in the specialized work of the near future. Modern equipment includes delicate weighing scales, a gage that measures thickness by magnetism, and a photoelectric reflectometer. To conserve

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floor space, the company also makes use of a rotary air compressor which is driven directly from an electric motor and has a capacity of 200 cubic feet of air per minute, providing 100 pounds of pressure.

The plant has effected an economy in heating, and saved space that might have been taken up for heating equipment, by piping the hot air from the space between the furnace arc and the flat top into the offices. Water for the plant is obtained through a drilled well. A centrifugal pump provides 50 gallons per minute or 35 lb. of pressure at the hydrant. Other sundry equipment includes a small reach-in sandblast booth, used largely in connection with laboratory work and also for cleaning burning tools, and a 12-foot spray booth for large work or specialties.

Management has tried to see that personnel will have the comfortable working conditions that promote efficiency. This consideration prompted a double-monitor construction of the plant with an abundance of steel window sash. Ample ventilation and natural lighting are provided. On dark days or late shifts, powerful fluorescent lights prevent eyestrain. Flooring is surface-hardened concrete. In this well-planned, efficient enameling shop, the emphasis on good equipment and pleasant working conditions pays dividends in the form of high-quality porcelain enameled ware.

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PRACTICAL NOTES
on
Decorative Chromium Plating

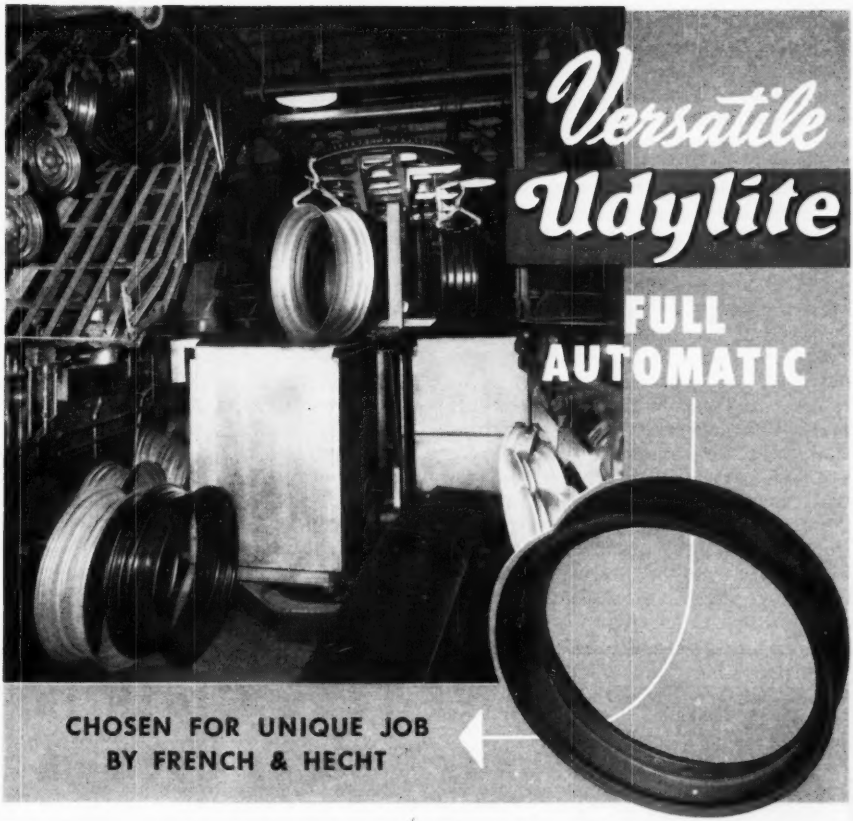
By JEROME L. BLEIWEIS
Metal Finishing Consultant

ALTHOUGH the chromium plating solution can be operated and controlled with little trouble, most chromium platers have experienced difficulties from time to time. The discussion which follows will describe some of the problems usually encountered, and outline precautions to be observed as well as steps to be taken to eliminate the difficulties.

Throwing Power

The throwing power of chromium plating solutions is notoriously poor. This is abetted by the unusual phenomenon occurring in chromium plating baths; namely, that the cathodic current efficiency increases with an increase in current density. In the 53.3 ounce bath for example, the current efficiency at 0.5 amp./sq. in. at 104 deg. F. is 7.1 per cent and at 5 amp./sq. in. it has risen to 26.3 per cent. Practically speaking, this means that the buildup on protruding areas is far greater than the buildup on recessed areas. If the current density in the recessed areas does not exceed a threshold value, no plating at all will occur on these areas. For example at 104 deg. F. in the 53.3-ounce bath at a current density of less than about 50 amp./sq. ft. no chromium is deposited at all. Where intricately shaped articles are involved or where recesses must be covered with chromium, as in holloware, the only way in which this intrinsic difficulty may be overcome and in which chromium may be successfully deposited, is by the construction of suitable racks equipped with thieves, where buildup or dull plating on edges is to be prevented, and auxiliary or inside anodes, where recesses are to be covered.

Thieves are constructed of metal wire and act as if they were extensions of the edges of the article being plated. They steal the current in high current density areas and allow the edge of the article to be plated at a current density still within the bright range. Auxiliary anodes are constructed of antimonial lead and are placed on the rack so that they act as inside anodes for the recessed area in question. Racks for intricate parts or for holloware must be specially constructed for each kind of article from considerations of the article's shape, size, areas to be plated and so on. Only contact areas and auxiliary anodes should be exposed. All other metallic construction should be insulated by means of suitable stop-off tapes or compositions. Provision must be made so that when the rack is suspended from the work rod, that portion of the rack connected to the auxiliary anode and insulated from those sections con-



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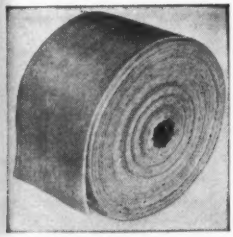
nected to the work rod, will make contact with the anode rod. The rack will consist of sections which will eventually be anodic, and sections which will eventually be cathodic.

Rack or Wire Contact

All wire and rack contacts leading from the work to the work rod must make positive contact with the work and the work rod if decorative chromium plating is to be successful. Loose contacts are inadequate. Making and breaking of contact in the plating bath will result in dull frosty deposits. Loose contacts will accentuate the normally poor current distribution.

When work is wired for chromium plate it is important to keep in mind that where the available wiring areas are exposed areas, tight wire contacts will result in nickel wire marks whereas loose loop-like contacts, particularly on light articles, will result in frosty chromium plating or in partial or no chromium plating. The best solution to this problem short of constructing racks—and this may not be feasible for short run jobs—is to wire loosely so that no troublesome and difficult-to-remove nickel wire marks will appear, and then chromium plate with the same loose contacts. Most of the parts will be satisfactorily plated. The cloudy and the partially plated and unplated parts can be sorted out, rewired tightly, immersed in concentrated muriatic acid to remove the chromium deposited, rinsed, soak cleaned for a few seconds in the cleaner, rinsed, pickled, rinsed thoroughly and chromium plated. At this point rejects of the type produced by loose wiring will be held to a minimum and, since the parts had been nickel plated previously, no wire marks will result. In chromium plating the appearance of wire marks is promoted by loose wiring and repressed by tight wiring. This is the reverse of what is experienced with nickel. Actually the wire mark, appearing upon chromium plating heavy objects, where contact



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is made via a loose loop, is more of a shadow, with the loop acting as a thief, than it is a wire mark. Decorative chromium is deposited only 0.00001 to 0.00002 inch thick so that contact wire marks would barely be visible, whereas wire marks appearing after the heavier nickel plating cycle are in reality depressions caused by the buildup of plate around the wire contact but not under the contact.

Current Distribution

The current distribution in decorative chromium plating normally leaves much to be desired. Threshold valves of current density for any deposition at all are high compared with the minima required for other plating solutions. This condition is aggravated where the part to be plated has a large surface area but a small cross section. Large, light gauge articles should be wired in several places close to their periphery and in one or two places close to the center. Unless this is done the relatively high electrical resistance of the light gauge article will further emphasize the disparity in current distribution.

Plating Conditions

Various practical difficulties may be experienced through incorrect operating conditions or bath composition. The bath conductivity will be lowered if excessive quantities of iron, copper, zinc, and so on, are present as impurities. Overly high current densities will produce burnt, nodular deposits on the edges and protrusions. Low temperatures will produce dull deposits. Low current densities will produce milky deposits or no deposits. Thin deposits, or a narrow bright plating range may be a sign of sulfate ratio which has drifted considerably away from the recommended value. However, aberrations accruing from composition deviations are easily rectified by chemical analysis and suitable additions to the bath. The bath is a simple one having only two constitu-

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ents. Wide variations in concentrations will not be detrimental as long as the proper ratio of chromic acid to sulfate is maintained. Analytical procedures are available in many standard plating texts.[1]

Nickel Undercoat

Chromium may be deposited directly upon most basis materials. As a matter of fact the throwing power of chromium plating solutions upon copper is somewhat better than on nickel. However, for decorative applications, chromium is almost always deposited upon a nickel undercoat. There are two reasons for this: first, the nickel undercoat provides corrosion protection which the thin and porous chromium plate does not; second, the nickel undercoat, either deposited from a bright bath or color buffed, provides the most lustrous base for the chromium deposit. After chromium is deposited upon the nickel undercoat, no more buffing is required. Color buffing of chromium is a very tedious and expensive operation. It may be resorted to in order to "shine up" those chromium plated articles which evidence dull edges, spots or areas on their surfaces after chromium plating. Where the quantity is small, color buffing may be a simpler expedient than stripping and replating.

The nickel undercoat controls the destiny of the final chromium deposit. If it is electrochemically or metallurgically poor, the chromium deposit will be unsatisfactory. Poorly adherent nickel deposits will peel or flake in the chromium bath or will yield nonuniform chromium deposits. Dull nickel deposits will yield dull chromium deposits. Passive nickel deposits will yield frosty and spotty chromium deposits. Passivation frequently oc-

[1] Dubpernell, G., "Chromium Plating," Modern Electroplating, published by the Electrochemical Society, 1942, pp. 127-129.

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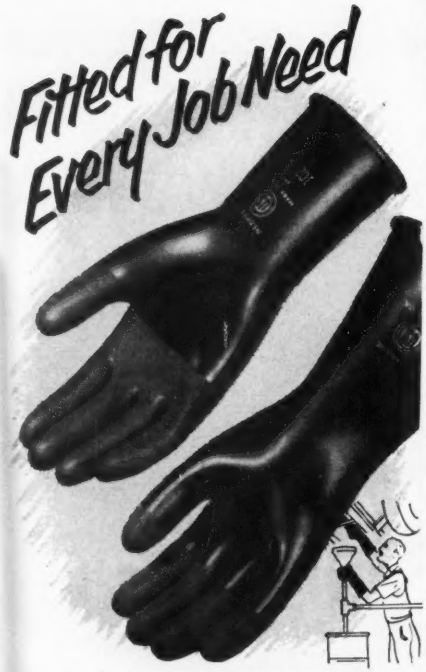

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curs after color buffing of nickel plate. If the buffing heats the work up to too high a temperature, a passive oxide coating may form on the nickel surface. Long periods of storage may passivate nickel. Anodic cleaning will passivate nickel. Passiviation may be removed most readily by buffing the nickel surface lightly but completely on a soft muslin buff using a small amount of lime as the abrasive.

Buffed nickel can be chromium plated directly without cleaning or pickling. However, results are better and more consistent when cathodic cleaning and pickling steps are included. Even when cleaning cathodically, if parts shadow one another, sometimes some of the surfaces may become passive by bipolar action.

Bright nickel may be chromium plated without intermediate buffing or drying. The use of an active bright nickel will assure optimum chromium coverage, provided that nickel deposition has been sound. The covering power of chromium on bright nickel is sometimes somewhat reduced unless intermediate activating dips to assure complete addition agent removal are introduced. The effect of these dips is to increase the extent of plating in the recesses of the article.

Rinsing

Thorough rinsing after nickel plating and before chromium plating is very important for successful chromium plating. Inadequate rinsing facilities or insufficient rinsing results in the appearance of rainbow patterns upon chromium plate. In one shop rejects due to rainbow formation were completely eliminated by dipping work coming out of the nickel plating solutions exactly 10 times in the rinse water before chromium plating.

Chromium Contamination

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move all chromic acid from the racks, this is a dangerous procedure. Very small quantities of chromic acid raise havoc with other plating baths. This is particularly true of nickel plating baths wherein small quantities of chromic acid cause reductions in current efficiencies and dark, blistering deposits. After going through the nickel and chromium cycle, racks should be rehabilitated by employing the following treatment:

1. Rinse thoroughly in water.
2. Immerse in a caustic soda or similar alkaline solution.
3. Rinse.
4. Immerse in a dilute muriatic acid solution.
5. Rinse.

Chromium plating baths should have separate cold and hot rinse tanks, not used in connection with other plating solutions, to prevent contamination of other tanks by chromic acid.

Reracking

Where it is not desirable or where it is difficult to take the same racks through the nickel and chromium plating operations because of the possibility of contamination of chromic acid or because of geometric considerations, two possible reracking procedures may be employed:

1. Work which is racked may be manually transferred while still wet from the nickel to the chromium plating racks by an operator wearing rubber gloves.
2. Wired work may be suspended on a rack containing pins or screws about which the wires are fastened after nickel plating. The rack with its suspended wires is then placed in the chromium plating tank.

Miscellaneous

Articles which have not been buffed but which require a bright but not highly reflecting surface, particularly small parts such as screws, pins, and so on, may be still tank, basket, or barrel chromium plated and then burnished to bring up the luster of any of the articles which have not been chromium plated in the bright plating range. Thin chromium deposits ball burnish very beautifully.

Articles which have been nickel plated should not be allowed to remain out in the air or in the rinse tanks for too long a period of time. Passivation may result and the subsequent chromium plate will not be bright.

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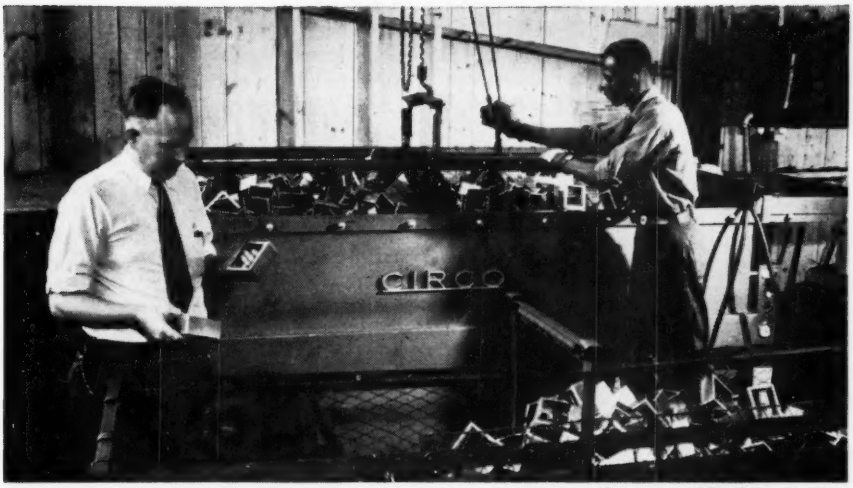

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Chromium may be stripped from nickel by immersion in concentrated muriatic acid for about 30 seconds or by immersion with reverse current in alkaline solutions. The latter method will result in passivation of the nickel. Re-activation may be accomplished by means of a light buffing operation or by means of any one of several chemical methods.

A Simple Semi-Automatic Laboratory Spraying Device

By E. R. MUELLER
Battelle Memorial Institute
Columbus, Ohio

NUMEROUS devices have been used to produce uniform coating films by spraying. In general, such devices have been used primarily in production operations. So far as is known, they have not been entirely satisfactory for the rather narrow openings in many laboratory spray booths. In many production operations the rate of spray gun travel approaches 120 feet per minute. Seventy-five to one hundred feet per minute is common. Attempts to duplicate such rates with automatic equipment in spray booths with 4-5 foot openings have very often been only moderately successful unless elaborate, expensive, and cumbersome equipment was devised. This is particularly true when uniform linear motion is desired. Such motion is obtained with the equipment here described.

Corrosion-Resistant Immersion Heater for Electroplating Solutions

The electric immersion heater illustrated is widely used in heating plating and pickling-tank solutions. Its advantages include quick, clean heating, minimum-space requirements and simple installation.

These units also have proved a great convenience in heating small tanks and pots and in their ability to be readily transferred from one job to another.

AMERSIL COMPANY INC.
900 PASSAIC AVE. EAST NEWARK, N. J.

Simple Equipment Devised

A spraying device was developed which can readily be constructed in the average shop at a very nominal cost. As can be noted in the accompanying photograph, this apparatus consists of a framework so arranged as to slide freely, by means of rollers, on a heavy rack of angle iron. The framework is propelled by means of a chain moving over two sprockets. A projection is fastened to one link of this chain on which is mounted a small ball bearing assembly which moves up and down between two small channel-iron strips fastened to the framework. The chain is driven by a variable-speed motor. We use a kitchen mixer unit, although motors of a number of other types undoubtedly would work equally well. Operation is controlled by a foot-switch conveniently located on the floor. Attached to the framework is a metal extension that serves as a panel-holder. Steel panels are held to it by three small horseshoe magnets imbedded in a plywood frame. Non-magnetic panels (that is, wood, glass, and aluminum) are easily held by suction cups fastened to a steel panel held by the magnets.

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Tough, Lasting ABRASIVE with increased adhesion for the set-up wheel

Photomicrograph of EXOLON RST Polishing Grains.

• EXOLON RST is aluminum oxide fused in an electric arc furnace to form a hard, enduring abrasive. It is crushed, carefully graded, run through powerful magnetic separators, and ceramically coated to increase adhesion to set-up wheels. These chunky grains of RST assure efficiency and economy in all types of metal finishing.

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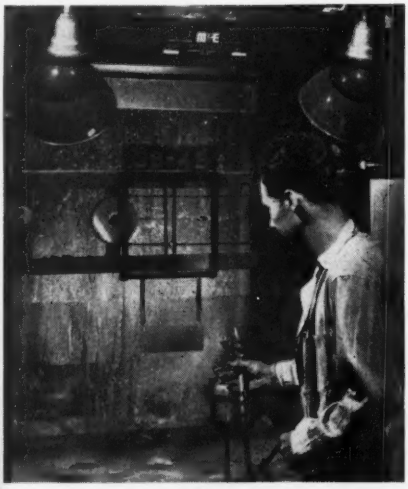
The spray gun is mounted on a rack which is designed to permit adjustment for height and distance from the panel.

This apparatus is designed to give uniform motion of the panel over about two feet of travel, since uniform lateral speed of the chain will be obtained from center to center of the two sprockets.



A water-washed spray booth in a coating laboratory at Battelle. The fixture in front of the water sheet is used in applying uniform thicknesses of films of paints and lacquers to test panels. The panel moves at a uniform rate of speed through the spray, which is emitted from a stationary spray gun.

Operation

In practice, the panel is placed on the holder and the driving motor is started. The spray gun is turned on by hand at the instant the panel leaves the extreme left or right-hand point of travel, and as the panel passes the gun, the coating is applied. Any number of passes may thus be made. The coating may then be applied at every pass or intermittently, as desired. One hundred and twenty-five feet per minute travel speed is easily accomplished without moving the panel back and forth so rapidly as to make uniform spraying difficult.

Examination of panels coated by this method shows that excellent duplication of results can be obtained, provided the speed of travel, the gun distance and air pressures are all carefully regulated. However, in our experience, it has been found that simply using the same adjustments on any particular coating will not ensure uniform results from day to day or from run to run. This can probably be attributed to such factors as the difficulty of resetting the gun nozzle to exactly the same position, and variation in air temperature. It is recommended that film thickness test panels (wet and/or dry) be run periodically to assure uniformity of results.

Adaptability

While the rack of our mechanism carrying the framework is conveniently fastened to the booth and hinged to allow swinging it aside when not in use, it could easily be modified to stand on legs in the booth. This would facilitate easy and complete removal of the mechanism while not in use.

A modification, allowing the spray gun to be turned on and off automatically, has been considered. This, however, has been found unnecessary, since in most cases, it can easily be done by hand in sufficient time to allow uniform application of coating upon successive trips of the panel past the gun.

ACKNOWLEDGMENT

The assistance of virtually all of the members of our Coatings Research Division in developing this instrument is gratefully acknowledged.

The small metal toy prizes, such as miniature dogs, horses, elephants, tanks, automobiles and tractors which are found in boxes of popcorn, are painted by tumbling methods.

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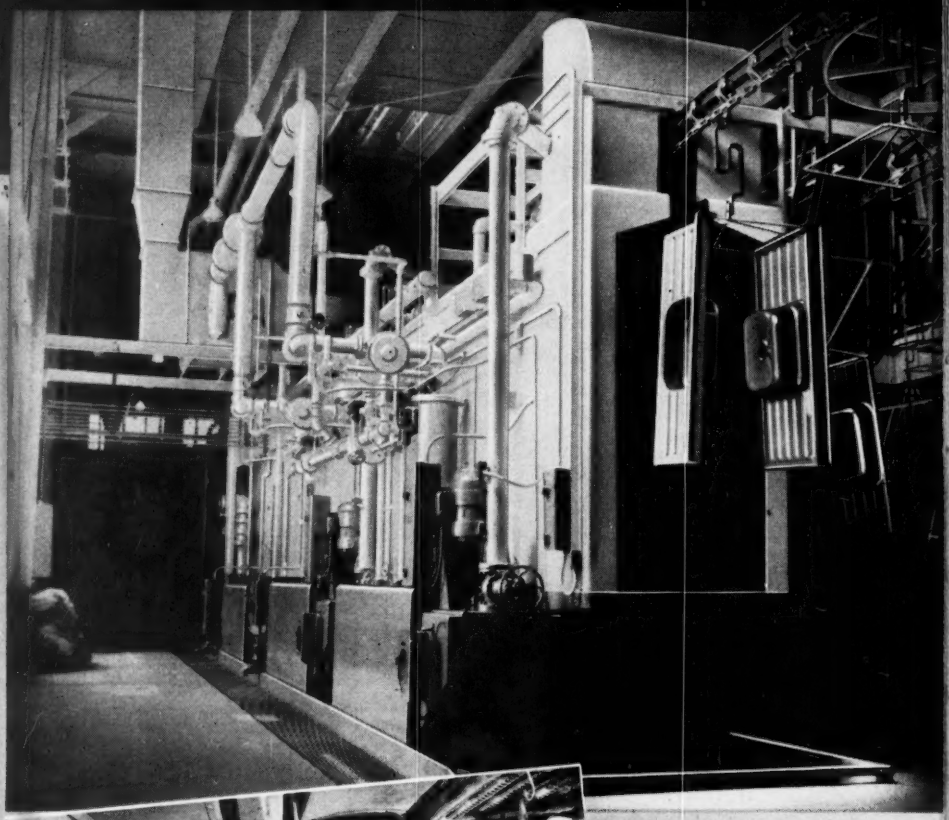

The Nine-Stage Spray Cleaning and Pickling Machine Above, Installed in the Kaiser-Fleetwing Plant, Bristol, Pa., was Designed by Mahon Engineers for Continuous Conveyor Processing of Parts and Products. A Hydro-Hermetic Seal at the Top of the Processing Tunnel Prevents Escape of Active Chemical Fumes and Protects the Monorail Conveyor.

Modern Mahon Hydro-Filter Spray Booth Specially Designed for Fast Spray-Angle Porcelain Enameling Operations.

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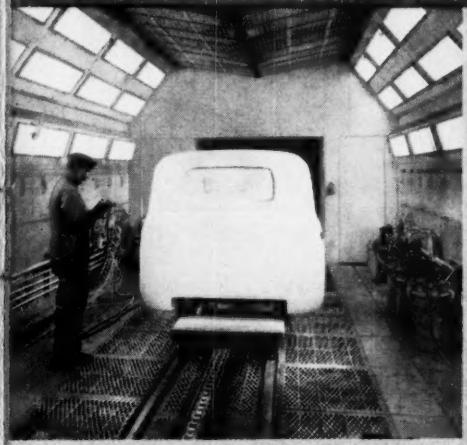
. . . for ENAMELS • LACQUER • PAINT • VARNISH



Modern Mahon "Downdraft" Hydro-Filter Spray Booth with "Hydraire" Flood Sheets and Sludge Unloader.

Modern Mahon Finishing System Designed for Diesel Tractors, Motor Graders and Earth Moving Equipment.

How Much Would MODERN EQUIPMENT Reduce YOUR Finishing PRODUCTION COSTS?

The revolutionary Mahon Metal Cleaning and Pickling Machine illustrated at left is just one example of cost reducing modern processing equipment. It Cleans, Pickles and Dries metal parts in less than one-third the time previously required for pickling . . it does a better job with greatly reduced volume of processing solutions—and, being completely enclosed, eliminates elaborate ventilating facilities normally required with outmoded pickling methods. No matter what your finishing equipment requirements may be, you can depend on the latest developments from Mahon, because, the Mahon organization has pioneered development in this highly specialized field for over thirty years . . . new methods and new equipment are constantly being perfected to produce better results in production finishing—and do it at a lower cost per unit. Therefore, when you consider new finishing equipment, remember that constant research, experimentation and broad experience have endowed Mahon engineers with a wealth of technical knowledge and practical know-how not available to you elsewhere. See Mahon's Insert in Sweet's Mechanical Industries File, or write for Catalog A-650.

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Engineers and Manufacturers of Complete Finishing Systems—including Pickling Equipment, Metal Cleaning and Rust Proofing Equipment, Dry-Off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Systems, and Drying and Baking Ovens; Core Ovens, Hydro-Foam Dust Collectors, Fog-Filters, and other Units of Special Equipment.

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The finish that introduced the furnace into playroom society

Problem: Design a mar-resistant, heat-resistant finish for furnace jackets that makes furnaces colorful and attractive as furniture.

Solution: Industrial Finish Engineers developed special finishes in striking colors that resist heat and marring. They go on quickly, dry faster. Their beauty helps sales.

The better the

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What industrial finish means to sales!

Here is a paragraph from a letter received from one of the largest furnace manufacturers in the country:

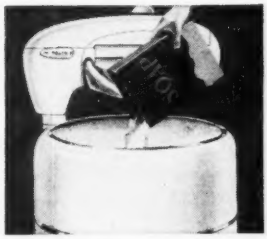
"We believe that the finish of our product is of great importance, because that is the part that people see. It plays a great part in selling customers on your product."

We repeat, this is one of the country's largest furnace manufacturers. A part of their success is due to Industrial Finish Engineering. Find out today how it can increase the saleability, lower production costs of *your* product.

The industry has technical ability to make finishes to suit your specific requirements. Remember, more and more of your customers *start buying with the finish in mind.*

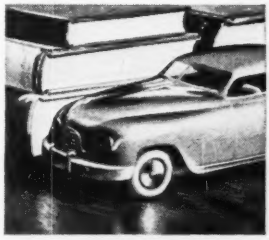
Problem: Find a finish for washing machines that would not be affected by soap and washing powders.

Solution: Industrial Finish Engineers developed special finishes that resist soaps, washing powders and hot water. These quick-drying and baked finishes can be applied after assembly, speed production, cut costs.



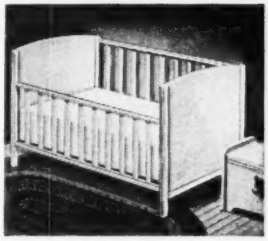
Problem: How to equip toy plastic cars with authentic-looking chrome bumpers, without upsetting production.

Solution: Industrial Finish Engineers developed a finish that will not attack the plastic—dries in one minute for continuous production. It improves saleability, keeps costs down.



Problem: How to eliminate the expense of spraying an undercoater over the stain on juvenile furniture.

Solution: Industrial Finish Engineers developed a dip method that used a heavily built-up stain. Result—production savings; a final finish equal in quality to the original method.



finish—The better the buy!

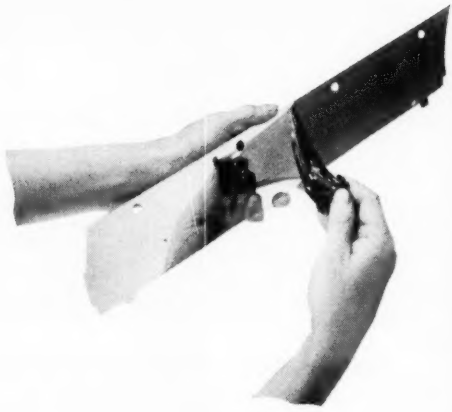
VARNISH AND LACQUER ASSOCIATION, INC., WASHINGTON, D. C.

PART IV

Liquid Masking Materials and Peelable Plastic Coatings

By ARTHUR P. SCHULZE

MODERN MASKING FOR FABRICATION



A Special Survey-Report

FEATURE

Spearheaded chiefly by the combination of wartime development research and postwar application work, liquid compounds and peelable plastic coatings have lost little time in demonstrating their ability to reduce labor, save time, and cut costs over a wide range of industrial applications.

Of these, protective masking for decorative spray finishing is merely one. Other, and equally important, uses to which these materials are now being put on an extensive scale involve the protection of raw materials, semi-finished parts or products, and manufactured goods in fabrication, in shipment, or in storage.

Still others are maintenance of spray booths and provision of glare diffusion in plants. These are the principal topics to which attention is directed in the following discussion

Among the newer labor-reducing, time-saving, cost-cutting aids to better masking available to industry are liquid compounds and strippable coatings. Utilization of these materials, especially the latter, extends far beyond masking applications as such. Main features and uses of both types are reviewed in the following article, which concludes the special series of four devoted to this subject.

MATERIALS AND METHODS AND SPRAY FINISHING

dealing with liquid masking compounds and peel-off plastic coatings.

Masking liquids commercially available today are of two types—the water-soluble type and the plastic type—both of which are applied by spray or brush methods. The water-soluble type is removed by scraping or flushing off with water, or by peeling. By loosening and taking hold of one corner, a workman can readily pull off the whole film, like peeling a banana, leaving a clean, paint-free surface underneath. The cohesive film formed by the liquid has adequate adhesive strength yet does not stick too tenaciously to the surface on which it is brushed or sprayed.[1]

Typical of the water - soluble type,

Fig. 1—"Liquid Envelope" is a typical example of the cost-cutting peelable plastic protective coatings developed through research for protecting polished or finished surfaces of both ferrous and non-ferrous sheet metals during forming, fabrication, assembly, inter-plant handling, storage and shipping operations. Representative applications are shown in these photographs. Film dries quickly, peels freely and easily—can be removed by mechanical means or can be blown off with an air-jet in mass-production operations. (*Photo courtesy Better Finishes & Coatings, Inc., Newark, N. J.*)

Fig. 2—Stainless steel sinks drawn on 400-ton hydraulic press at the Legion Utensils Company, Long Island City, N. Y., are protected against die marks, scratches, grease and fingermarks by a 0.003-inch thick film of "Spraylat Compound." Operator is shown inserting Type No. 302, 18-gauge stainless steel blank for 6½-inch draw. *(Photo courtesy Spraylat Corp., New York, N. Y.)*

●

which can be thinned with tepid water for spraying purposes, are PRD and LPM Coating and Masking Compounds, manufactured by Detrex Corp., Detroit, Mich.; and "Plask WS," developed by The Servwell Products Company, Cleveland, Ohio. Non-flammable, it has good film strength; also it peels away readily, particularly from such plastics as Lucite and Plexiglas.[2]

Aptly exemplifying masking liquids of the plastic type are "Paint-Shield," manufactured by Ramsell Products, Inc., Palo Alto, Calif., "Plask," produced by The Servwell Products Company, Cleveland, Ohio; "Striplastic," a product of the Striplastic Company, also of Cleveland; "3M" Strippable Coatings, both solvent-type and water dispersion, made by Minnesota Mining and Manufacturing Co., St. Paul, Minn.; and "Spray Peel," manufactured by Eronel Services, Inc., New Milford, Connecticut.

The first material, which the manufacturer describes as a "liquid masking tape," is a Vinylite resin solution that dries within 10 minutes, giving protection against all types of paint, lacquer and enamel. The thin protective film formed can be peeled quickly in a solid sheet. One large fleet operator uses the material to mask lettering prior to painting in order to save added re-lettering costs.[3]

"Plask," also a peelable masking

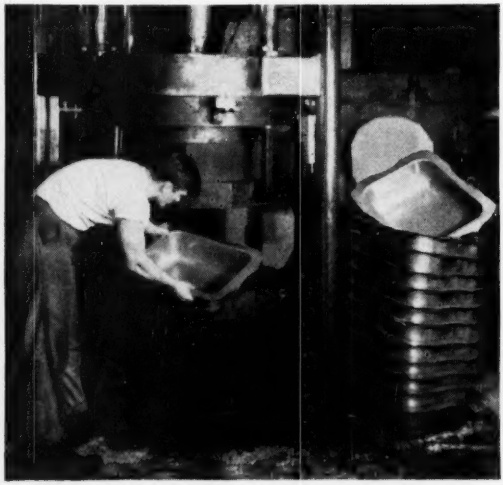


Fig. 3—Removal of stainless steel sink, drawn to 6½-inch depth, on 400-ton hydraulic press at Legion Utensils Company, Long Island City, N. Y. Note Spraylat protective plastic film is left intact. *(Photo courtesy Spraylat Corp., New York, N. Y.)*

●

coating, finds widest usage presently in connection with automotive refinishing, although other applications, such as product protection during fabrication, are growing rapidly. Thinned with alcohol for required consistency, it may be applied by dip, spray, or roller coat, and dries tack-free in about five minutes at room temperature. Plask coated surfaces may be sprayed over within three minutes; waiting until dry to the touch is unnecessary. Detrex LPM (Liquid Paint Mask) is also used in automotive refinishing, and may be sprayed on with regular paint spray equipment and removed, after painting and subsequent operations, by peeling, scraping, or merely washing the vehicle with water.

Use of a plastic type paint spray protector in automotive refinishing shops has cut masking time by half—frequently more—on such jobs as masking windows, headlights, handles, ornaments, accessories, nameplates, insignia, chrome surfaces, and baked automotive finishes. For example, in one shop, where masking of car windows with newspapers and tape once took from 40 to 60 minutes, the job is now done in 20 to 25 minutes simply by masking the outside edges with tape, then brushing the glass with "Plask."[3] Time savings ranging as high as 74 to 85 per cent in masking glass, chrome and auto bodies are being established in many automotive painting shops by the use of "Auto Paint Shield," a Ramsell development."[4]

Another important industrial job expedited and improved with a plastic coating is the protection of metal surfaces during fabrication.[5, 6] United Refrigerator Company of Hudson, Wisconsin, for example, has speeded its handling of stainless steel sheet and parts by 14 per cent and has cut its costs appreciably, through the use of "3M" Strippable Coating.

The plastic protection, sprayed on stainless steel sheets used in making refrigeration cabinets, protects the

Fig. 4 — Spraylat protective coating, when dried, produces a transparent, strong, abrasive-resistant, elastic film which adheres firmly to surface protected. It is easily removed by a steady pull in lifting it from the surface. In this application and many others, Spraylat coatings preserve the finish of stainless steel, eliminating costly repolishing of scratched surfaces.

(Photo courtesy Spraylat Corp., New York, N. Y.)

No. 4 stainless steel finish throughout fabrication, along an assembly line on which more than 80 men handle the parts. Previously, these operators used paper sheets to cover the metal—but the paper proved difficult to keep in place, had to be removed for each assembly line job, and then had to be picked up and replaced on the steel between jobs. That involved excessive and costly handling. The plastic coating, on the other hand, remained securely in place throughout fabrication, completely eliminating the extra handling formerly required.

As a stop-off in selective plating cycles and as a masking compound in painting and finishing operations,

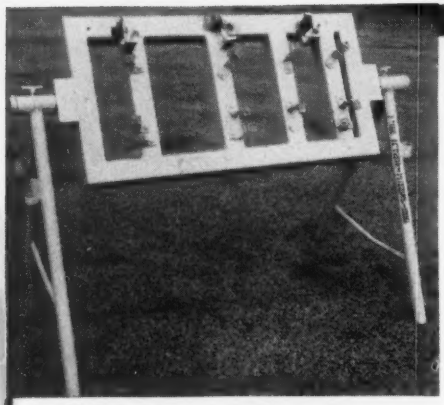


Fig. 5—Peelable plastic coatings have given Douglas Aircraft at its El Segundo Plant an economical, effective way to protect metal airframe fixtures and plastic patterns against weathering and deterioration during outdoor storage. Assembly jigs and fixtures such as the one shown above are enameled and machined surfaces greased, then sprayed with "Liquid Envelope."
(Photo courtesy Douglas Aircraft Co., Inc., El Segundo Plant, El Segundo, Cal.)

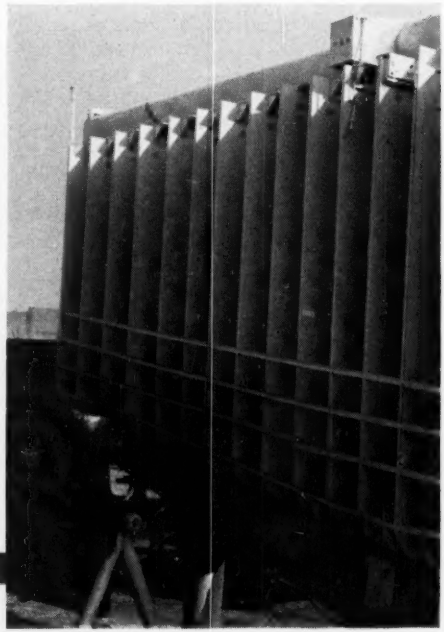
strippable plastic coatings have many potentially advantageous applications.[7] Only now are these new application frontiers being more intensely explored and developed. It is in the protection of surface finishes, however, that the use of these coatings has made its most rapid and spectacular advance since the war.

Peel-off coatings, as finishing materials, are still in their infancy—but they are growing up amazingly fast. This progress is due not only to technological developments, but also to the increasing consciousness among finishing superintendents and process engineers of the importance of adequately protecting surface finishes against marring, abrasion or other mechanical damage during fabrication. Appreciable economies in finishing deep drawn stainless steel sheets are being effected in several stamping plants, where strippable coatings applied to sheets remain on work in process. This application is but one of many that have been developed in which peelable coatings are being successfully employed in protecting polished surfaces prior to forming and also during machining, punching, welding and other fabricating operations.[8]

Today, there are probably from 20 to 30 of these temporary peel-off coatings on the market.[9] Typical examples, and representative applications of each, are reviewed below. In this connection, however, a note of caution: In using **any** peelable plastic films for masking, the user should make absolutely certain beforehand that the solvents employed by the manufacturer of the particular material will not soften or raise the finish to which it

Fig. 6—To prepare large assembly jigs for storage in open areas, standard ¾-inch masking tape is applied in 6-inch squares, forming a foundation for a webbing agent subsequently sprayed on to serve as a base for the "Liquid Envelope" protective plastic coating. The webbing agent, also a strippable plastic coating, fills voids between bands of masking tape.

(Photo courtesy Douglas Aircraft Co., Inc., El Segundo Plant, El Segundo, Cal.)



is applied. This precaution holds true for other uses as well, where the protective film is applied over an organic finish.

One of the earliest, and still among the most widely used products of this type, is "Liquid Envelope," manufactured by Better Finishes & Coatings, Inc., Newark, N. J. Originally developed early in World War II to "moisture-proof package" complete aircraft being shipped overseas as deck cargo,[7] this coating material first attracted considerable attention for peacetime application in 1945, when Eastern Stainless Steel Corp., Baltimore, began investigating plastic materials as a possible means of protecting the surface of stainless steel sheets during shipping and subsequent handling in fabricators' plants.[10]

For many years prior to that time, stainless sheet producers had used gummed paper to protect sheet surfaces. Although the protection desired was obtained, the method presented some application difficulties, particularly with the wider widths, as well as variations in quality of paper and troubles sometimes encountered in removing the paper coats which had adhered to the surface too strongly. In view of these complications, Eastern Stainless Steel Corporation's technical staff set out to find a better means of sheet surface protection. Possibilities of using a material that would remain on the steel throughout fabrication and which was also easily strippable appeared particularly attractive.[10]

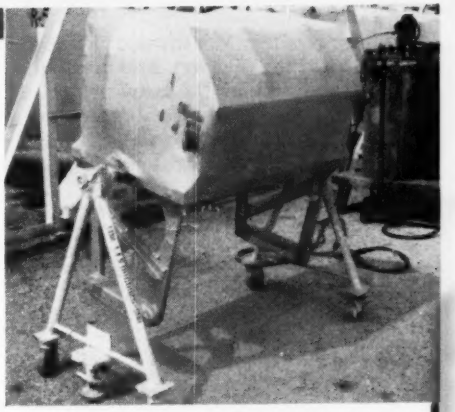
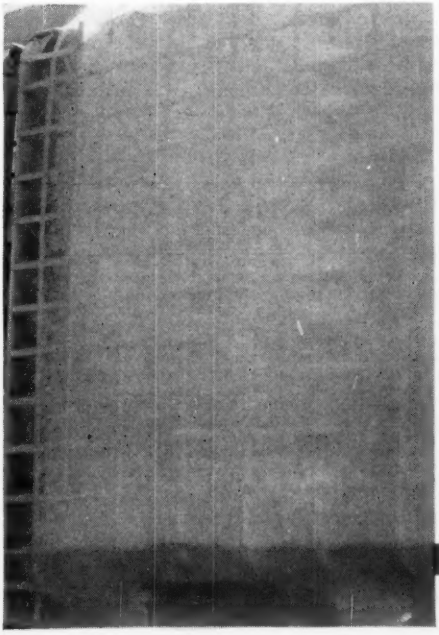
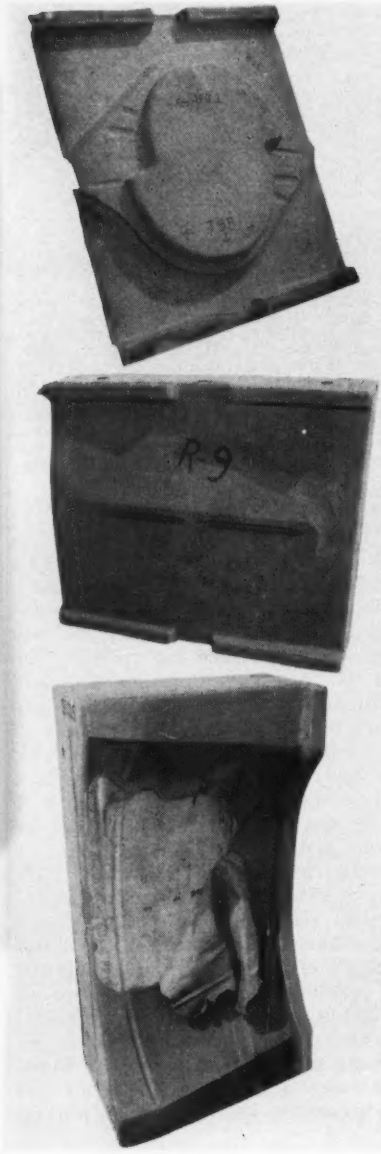


Fig. 7—Following application of tape and webbing agent, a thin coating of the strippable plastic is sprayed on the fixture or pattern and allowed to dry. This film is relatively light, thereby avoiding too much initial weight on webbing. Coating is subsequently built up to approximately 1/16-inch thickness. Gun used for spraying webbing agent and peel-off plastic coating is equipped with a fluid tip and needle; materials are applied at approximately 60 p.s.i. from mechanically agitated pressure tanks.
(Photo courtesy Douglas Aircraft Co., Inc., El Segundo Plant, El Segundo, Cal.)



Subsequent laboratory tests, supplemented by actual production experience in numerous stamping plants, have clearly demonstrated the cost-cutting merits and other advantages of this peelable plastic protective film as applied in finishing deep drawn stainless steel parts. Attesting to the effectiveness of this coating are its minimization of die marks, scratches and other marring encountered in normal

handling routine. Moreover, it appears to lubricate the dies, tending to reduce power requirements in drawing.[10]



One pioneer in the use of stainless sheets coated with "Liquid Envelope," Portland Copper & Tank Works, Inc., South Portland, Me., has reported that in drawing a stainless steel sink bowl on a 350-ton press, the material eliminated scratching 100 per cent—there was no need for hand finishing or polishing. Harman Hugo, manager, added: "This feature in itself was a decided boon. But as time went on other advantages showed up that really proved its worth. Galling of dies became a thing of the past—no more time lost in hand stoning. We used less drawing compound and we also noted that the envelope did not peel or break in the drawing. The envelope came from the press as though it were an integral part of the bowl. When ready for the stock and shipping room we found its removal as easy as peeling a banana. But the most important point to us was the fact that in the drawing process we did not lose the original natural beauty of the polished stainless steel sheet."[10]

B. H. Hubbert & Son, Inc., of Baltimore, manufacturer of stainless drawn steam-jacketed kettles, points out that "Liquid Envelope" expedites production by permitting the start of fabrication with polished sheets when making certain items. Also, the material

Fig. 8 (top)—Shown here is a typical plaster pattern before coating for "open storage" at Douglas Aircraft's El Segundo Plant.
(Center) — Application of strippable plastic coating to plaster patterns presented a problem due to the plastic's adhesive quality, causing the coating upon removal to pull away particles of plaster. This was overcome by brushing patterns with a thin coating of lard oil before applying plastic coating. Shown here is pattern after preparatory lard oil coating.
(Bottom)—As illustrated here, the "Liquid Envelope" peelable plastic protective coating is simple to remove from plaster patterns, leaving a clean, unmarred surface. This method of preserving large tools standing in open areas provides many distinct advantages.
(Photo courtesy Douglas Aircraft Co., Inc., El Segundo Plant, El Segundo, Cal.)

proves useful as an anti-spatter medium in certain welding operations. It is estimated that several dollars per unit are saved by using the plastic material, as compared to the assembly method previously used.[10]

Many other plants have experienced comparable results with plastic coated stainless steel sheet. Consequently, when demand outstripped Eastern's coating facilities in 1947, this producer installed an automatic sheet coating setup. The conveyorized installation provides for a continuous flow of sheets through an automatic degreaser, thence through an automatic spray booth and an infra-red oven. After coating on a continuous conveyor, the sheets are made ready for shipment. This special installation produces uniformly high quality coats and performs the operation economically.[10]

Safeguarding aluminum and aluminum alloy sheets during handling, fabrication, storage and assembly, and protecting spare parts for shipment are other important, growing applications of this particular peelable protective plastic film, particularly in the aircraft industry. At Canadair, Ltd. of Montreal, Canada, for instance, this material is proving indispensable in the protection of aircraft skins against scratches and shop handling damage.

Here, aluminum alloy sheet upon receipt is sprayed with a 0.002-inch coating of "Liquid Envelope" and dried under infra-red lights for approximately 45 seconds at 250 deg. F., then stacked vertically in storage racks prior to forming and riveting.[8] In shearing of sheet to size and brake bending—two operations where protection against scuffing and die marks is especially important—scrap has been virtually eliminated. Other fabricating operations in which this coating provides the desired protection include clamping of sheets for wing assembly, hot dimpling and riveting on fuselage sections, and riveting subassemblies.[12]

Protective packing of spare parts also has been improved and costs reduced by Canadair through the use of "Liquid Envelope." Previous practice, time-consuming and expensive, consisted of slushing parts with a preservative compound, then overwrapping

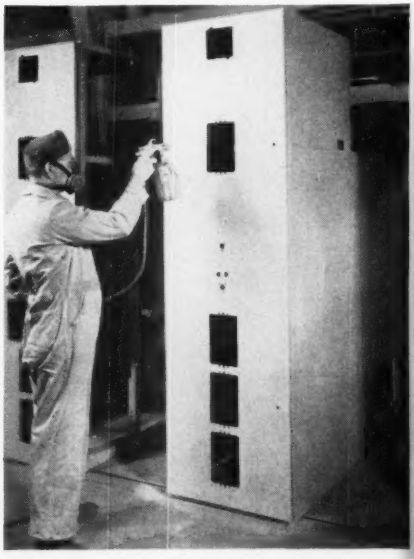


Fig. 9—Plastic protection for indoor switchgear is secured at Westinghouse Electric Corporation's Pittsburgh (Pa.) Plant. Plastic coating is sprayed on metal-clad switchgear before assembly, just after final painting.
(Photo courtesy Westinghouse Electric Corp., New York, N. Y.)

them in two or three thicknesses of paper. So long as the paper wrap did not become punctured in transit, reasonably effective protection against corrosion was obtained. Before use, however, all parts so protected required thorough washing in gasoline or kerosene to remove all protective grease from cracks and crevices—an operation that might well entail several hours' work.

Now, all openings are simply taped and parts sprayed with a 0.015-0.020-inch coating of "Liquid Envelope

Aluminum Cold Spray No. 5291-AL." Thanks to this simplified method, considerable time and effort are saved—and the impervious plastic coating

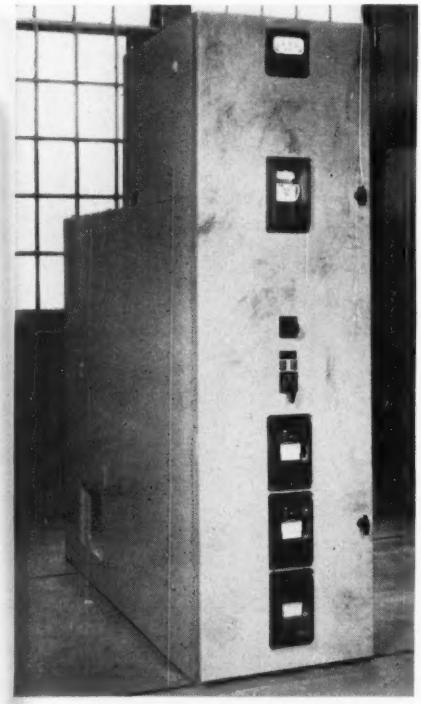


Fig. 10—Unavoidable smudges and grease on this switchgear unit affect only the protective plastic coating, not the original factory-painted finish.
(Photo courtesy Westinghouse Electric Corp., Pittsburgh, Pa.)

provides parts (motor mounts, wing tips, spring assemblies, exhaust pipes, oil cooler scoops) with excellent protection against corrosion in transit and storage. And when parts are needed for use, the coating is stripped off, leaving a clean surface instantly ready for installation.[12]

Strippable plastic coatings also have given the aircraft industry a money saving answer to the problem of preventing deterioration of metal airframe fixtures and plaster patterns stored in open areas and exposed to weathering. What's more, this type coating permits re-use of parts without extensive reworking or repair. That's the experience of Douglas Aircraft Company's El Segundo, Cal. plant.[13]

To fully appreciate the scope of this storage problem, remember that this tooling, large in size and fabricated from iron pipe, steel and plaster, must be maintained for long periods to meet government contract requirements as well as for both experimental and production aircraft if needed. To provide adequate covered storage area for airframe jigs, fixtures and patterns required to make a single-engine plane would entail some 5,000 sq. ft. Due to continued high building costs, coupled with the value and maintenance costs of existing facilities, use of a conventional structure to house such tooling having no known requirement is economically out of the question. Outdoor storage is thus called for, exposing tooling to weathering.[13]

In the past, various types of paints and oils have been used to protect metal jigs and fixtures. These preservatives proved satisfactory up to a certain point, but they also presented certain problems, particularly as to cleaning at time of use or reworking of the part prior to use. Seeking a better solution to this tool preservation problem, Douglas experimented with numerous plastic materials. From a study of these compounds, application methods, and comparative cost analyses, it was determined that peelable protective films afforded maximum protection and assured readiness for re-use.[13]

At Douglas' El Segundo Plant, metal jigs and fixtures are preserved by means of this five-step procedure:[13]

1. Spray painting with standard fast drying enamel after all machine surfaces have been greased

adequately.

2. Applying standard ¾-inch masking tape in 6-inch squares to serve as foundation for webbing agent. (If area to be covered is small, no tape is necessary.)
3. Applying webbing agent (also a strippable plastic coating) by spray gun.
4. Spraying first coating (light) of the plastic after webbing agent has dried. All sharp corners and inaccessible crevices are then sealed with Pliofilm tape.
5. Applying second (heavier) coating of the liquid plastic to build up overall thickness of covering to ⅛-inch. The two coatings may be of different colors, secured by adding pigment, to secure or assure a complete covering.

Unless placed flat, plaster patterns are difficult to store, presenting a storage problem due to lack of covered area. And when placed in open areas, such patterns upon exposure to the weather deteriorate quickly. Strippable plastic coatings first proved unsatisfactory, as the plastic, due to its adhesive quality, pulls away particles of plaster upon removal. This trouble was overcome by brushing a thin coating of lard oil on the plaster before applying the plastic film. Plaster patterns so treated can be stored in open areas indefinitely.[13]

Use of strippable plastic coatings provides many advantages in this protective application, Douglas has found. Tools so treated are prepared easily, quickly for re-use. Whereas airframe jigs of average size and complexity, preserved with oil, required approximately two weeks' repair time, plastic-enveloped tools are made ready for production use in merely one hour—a saving that is particularly important in aircraft manufacture due to the frequent urgent need for replacement parts. Other advantages of the plastic masking compound are: no radical change in physical properties upon subjection to alternate periods of moisture and dryness; no effect on material covered; and simplicity of removal. The material also leaves a clean, unmarred surface.[13]

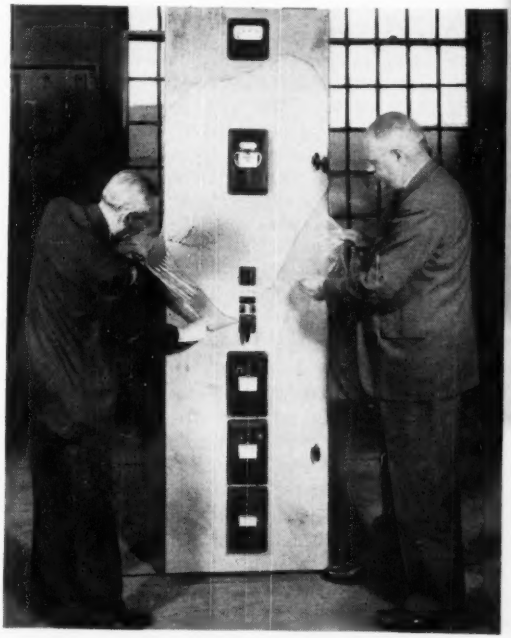


Fig. 11—After installation of Westinghouse switchgear in user's plant, the protective plastic coat peels off easily in a few minutes, leaving a clean, unmarred surface-finish.
Removal of plastic coat reveals original smart appearance of unit. The tough protective coating protects the finish through final assembly and wiring—and during subsequent shipment and installation as well.
(Photo courtesy Westinghouse Electric Corp., Pittsburgh, Pa.)

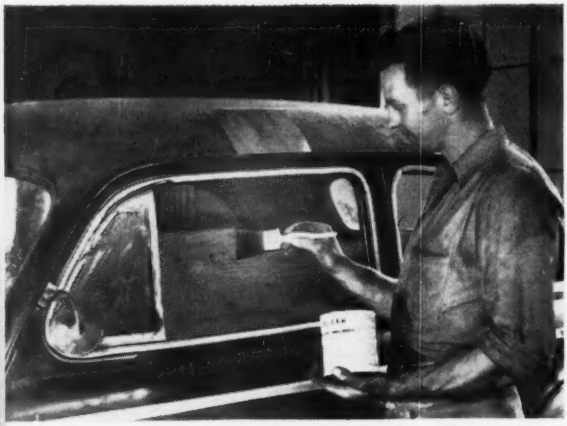


Fig. 12—"Plask," a plastic masking liquid, finds wide use in automotive refinishing shops. It is brushed on easily like paint and dries in five minutes.
(Photo courtesy The Servwell Products Co., Cleveland, Ohio)

As a tool preservative, use of the strippable plastic coating is quite inexpensive in relation to the initial cost of the items protected. Only simple equipment is required; it is economical to operate; and the number of employees required to service a storage area of average size does not exceed the number required to preserve the same items in oil. Moreover, it is not necessary to periodically re-preserve tooling so covered as was formerly necessary when oil was used. Other aircraft producers now enjoying similar results include Grumman Aircraft Engineering Corp., Bethpage, N. Y., and Republic Aviation Corp., Farmingdale, New York.

Still another increasingly important application of sprayable plastic films is for the temporary protection of acrylic sheets as used by prominent sign manufacturers. The procedure used in making the acrylic sign is the usual one; this is, heating the acrylic sheet to softening point, placing it in a mold, forming the sign and removing it when cold. The sign is then sprayed on both sides with Spraylat "A". Outlines of letters or designs are scored with a knife, and Spraylat "A" is then removed from the area of the letters or designs. The clear area is then sprayed with paint made for the purpose. In short, Spraylat "A" serves as masking on one side and protection on the other side during fabricating operations.

"Spraylat" compound is applied with pressure-type spray guns on acrylic sheets. When dry, "Spraylat" is a tough, uniform resilient coating which protects the surface during manufacture, shipment, and storage.

"Spraylat" strippable protective coating compounds are presently being employed for many other protective applications involving a multitude of different materials and surfaces. Among them are: acrylic base plastics, cellulose acetate plastics, polystyrene plastics, decorative laminates, vitreous porcelain finishes (bathtubs), polished ferrous and non-ferrous metals and alloys, rubber, glass, nickel and chromium plated coatings, shoe uppers made of leather or fabrics.

Thinned with tepid water only if required for smoother spraying operation, "Spraylat" films can be air dried at room temperature, requiring at least 12 hours to attain maximum film strength. Drying can be speeded up, however, by circulating air past the film or by using heating conveyors. Freedom from fire and explosion hazards marks an outstanding advantage of these compounds, which are emulsions of film forming material dispersed in a water medium. No volatile solvents are present.[16]

For general protection, a 0.003-inch film is applied. At this thickness, one

gallon of "Spraylat" covers 200 sq. ft., representing a material cost of $.022 per sq. ft. Application cost, as calculated by most plants, is $.01 per sq. ft. of surface treated. A similar material primarily designed for product protection is "Plask CH." It dries in a few minutes after application, and takes about 12 hours to develop film strength.

Savings of from 50 to 75 per cent in the cost of polishing stainless steel sinks are being secured by various stamping plants through the use of "Striplastic," which has eliminated at least six handling steps in fabrication from blank steel sheet to the finished product. Other important applications of this material include covering of tinplate stacks in tinplate mills for shipping purposes, to prevent rust and corrosion; preserving surfaces of stainless steel used for exterior automotive trim; as a masking stop-off in selective hard chrome plating of machine tool equipment surfaces and components, and protection of copper clad household consumer ware against corrosion in production and shipment.[16]

Developed by The Striplastic Company, Cleveland, O., this chemically-inert, non-toxic material of high tensile strength is easily applied by spraying, dipping or rolling. It dries to the touch in from 5 to 10 minutes. Its outstanding properties are: 335 per cent elongation, 4920 p.s.i. film strength, 120 to 150 sq. ft. per gal. coverage, and viscosity "A" Gardner-Holt Bubble Tubes at 26 deg. Centigrade.[16]

Protection of silverware from tarnishing, cap sealing of bottles, dipping of sterilized surgical instruments during storage and shipment, and protection of fragile apparatus illustrate typical applications of another peelable plastic material, "Prox Peel," a product of Pyroxylin Products, Inc., Chicago, Illinois.

Applied by cold-dipping, brushing, or spraying, "Prox Peel" of the lacquer type also can be used as a masking material. This material also is available in molten types which, melted and applied by a "hot dunking" process, are suitable for the protective packaging of some 40 different types of machined parts or fabricated components.[17]

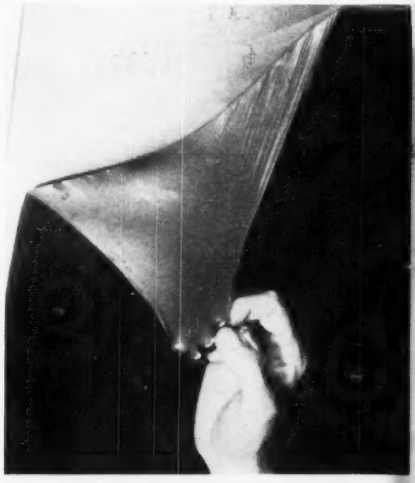


Fig. 13—"Plask" peels off in sheets, leaves protected surfaces clean.
(Photo courtesy The Servwell Products Co., Cleveland, Ohio)

"Plasto-Pak," an air drying plastic polymer in solution form suitable for dip or spray application, is still another widely used strip coating designed to prevent corrosion, tarnishing, scratching, or soiling of metals during production, assembly, shipping or storage. Made by the Standard Varnish Works, Staten Island, N. Y., this material can be used on large or small products, providing complete protection against the elements without costly packaging. Its features are summarized in Table 1.[18]

To provide a protective coating for metals and finished products over which they are applied, Maas & Waldstein Company, Newark, N. J., developed its "Copeel" compounds, which resist rust, corrosion, marring, or

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TABLE I

PERFORMANCE TESTS	CONDITIONS	RESULTS
Aging Test	48 hours at 140 deg. F.	Film unaffected
Flammability	Direct flame of Bunsen Burner	Film decomposes, does not ignite
Low Temperature Flexibility	Bend around 1/16th-inch mandrel at minus 25 deg. F.	Good. No cracking
Durability	300 hours' weatherometer exposure. Nat'l Carbon 3X	Excellent
Cold water immersion	24 hours	Unaffected
Resistance to 190-proof alcohol	24 hours	Unaffected
Salt spray	20% NaCl solution at 95 deg. F., 200 hours	Unaffected
Oil resistance	72 hours at 140 deg. F.	Unaffected
Resistance to 5% HCl Solution	48 hours	Unaffected
Resistance to 5% NaOH Solution	48 hours	Unaffected
Resistance to Hypoid Grease Lubricant	24 hours	Unaffected
Shrinkage Test	24 hours' aging	Film shows no shrinkage
Abrasion Test	Taber Abraser (CS-10 Abrasive Wheel) (thickness—4 mils)	Shows no wear in 7000 wear cycles. Loss in weight 0.002 gram.
Tensile strength	Before and after aging	Minimum 1250 lb. per sq. in.
Ultimate elongation	Before aging After aging	308 per cent 258 per cent
Dielectric properties	60 cycles (short time method)	800 volts per mil
Humidity	2000 hours	Unaffected
Heat-sealing properties	100 deg. C and higher	Excellent

scratching. Four types are available: (1) "Copeel Plastic Hot Melt No. 27," a 100 per cent solids material in briquette or cake form, reduced by heat for dip application, that produces a water resistant coating for protecting highly machined precision parts; (2) "Copeel Liquid Plastic No. 97," for cold dipping applications requiring only temporary protection; (3) "Copeel Liquid Plastic GY-544," a slightly tinted clear coating to protect polished metals and products finished with baked enamels; (4) "Copeel Liquid Plastic 875-A," used where a clear, colorless peelable coating is desired.[19]

Spray booth cleaning and maintenance have long constituted a bugaboo for most finishing departments and painting shops. For masking of booth surfaces to protect them from paint spray accumulation, the advent of strippable plastic and other types of peel-off coatings has proved a big boon from the safety, time, labor and cost standpoints. Consequently, what once was a tedious, time-consuming task is now handled with new standards of performance.

Ever since the first spray gun was put into operation, the problem of removing accumulated paint overspray from spray booth walls has persistently plagued many industrial finishers. Lining the booth with kraft paper—or even newspapers—was one of the earliest approaches to prevent overspray from hitting spray booth walls and sticking to them.

But the fire hazard created by tinder-dry paper—caused by the continual blasts of air from the spray gun and the rapid change of air brought about by the fan at the back of the booth—prompted operators to experiment with chemicals or compounds for coating booth walls to prevent paint from sticking, and which would thus make it possible to scrape off the paint when it got "dirty" enough.

Although grease proved very effec-

tive for this purpose, its use was found to present two major disadvantages: (1) the grease oxidized rapidly, so that if the booth was not cleaned for several weeks, the paint stuck to the metal; (2) since the grease was highly flammable, fire hazard was increased.

Because insurance rates were based on the extent of the fire hazards present, many spray painters looked with disfavor upon the use of either method. The only way that could satisfy insurance companies was to scrape booths every week (or every day where spraying operations were heavy) with brass or copper scrapers, thus removing the flammable paint accumulations. Expensive and time-consuming, this job was a definite deterrent to full production since the assembly line had to be shut or closed down while spray booths were being cleaned.[20, 21]

Today, this essential phase of spray booth maintenance has been almost miraculously simplified, safety substantially improved, time saved, and costs cut by the development of protective compounds and vinyl-type plastic coatings that are easy and quick to apply and to remove. Among these, to mention merely a few typical ones, are: "Vincote," manufactured by Detrex Corp., Detroit 32, Mich.; "E-Kon-O-Kote," supplied by Crescent Chemical Corp., Perth Amboy, N. J.; "Boothcote," manufactured by Harris Soap Division of Hygrade Food Products Corporation, Buffalo, N. Y.; "Strip-Eez Silver," made by Strathmore Products, Inc., Syracuse, N. Y.; "Filmite," a product of The Du Bois Company, Cincinnati, Ohio; "Spray Booth Shield," Ramsell Products, Inc., Palo Alto, Calif.; "Striplastic Booth Coat," The Striplastic Company, Cleveland, Ohio; and "Liquid Envelope Spray-Booth Coating," Better Finishes & Coatings, Newark, New Jersey.

Applied by brush or spray methods, these non-flammable materials dry in a matter of minutes, forming a tough, flexible protective film, which can be peeled off in big continuous sheets regardless of the thickness of accumulated overspray. No scraping is necessary. The coating is merely loosened at one point by cutting through it with a sharp instrument, then peeling back the film slowly and evenly in one sheet, leaving the surface clean and ready for another application.

This method of booth cleaning is reported to provide manhour savings of from 50 to 75 per cent over previous-

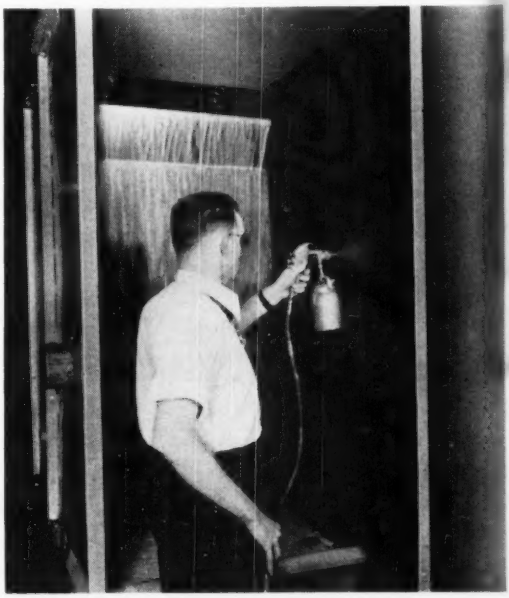

Fig. 14 — Spray booth operator is shown coating spray booth walls with "Vincote" vinyl-plastic booth coating material.
(Photo courtesy Detrex Corp., Detroit 32, Mich.)

ly used practices. Translucent films of these materials are now rapidly finding use for coating windows and light fixture openings in offices, factories, and laboratories to kill glare and heat.

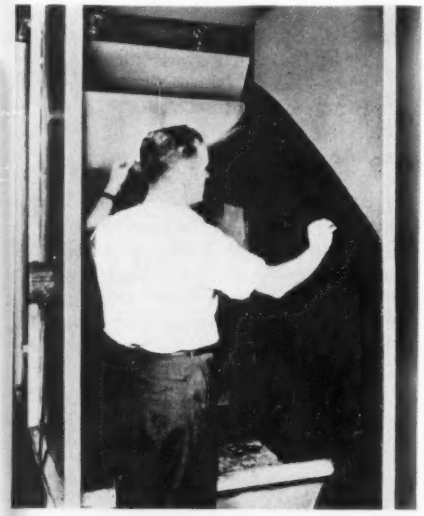

Fig. 15 — Operator is shown peeling Vincote spray booth coating together with accumulated paint overspray from the spray booth wall. The low adhesiveness of Vincote facilitates this operation.
(*Photo courtesy Detrex Corp., Detroit 32, Mich.*)

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Eronel Services, Inc.
New Milford, Conn.
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Buffalo, N. Y.
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Newark, N. J.
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Palo Alto, Calif.
The Servwell Products Company
Cleveland, Ohio.
Spraylat Corporation
New York, N. Y.
Standard Varnish Works
Staten Island, N. Y.
Strathmore Products, Inc.
Syracuse, N. Y.
The Striplastic Company
Cleveland, Ohio.
Westinghouse Electric Corporation
Pittsburgh, Pa.

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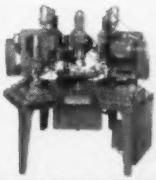

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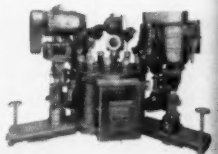

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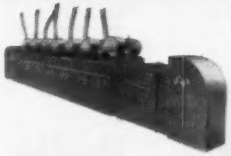

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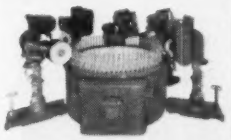

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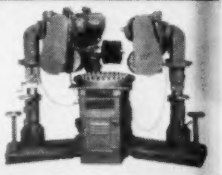

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Safety Is No Accident

ACCIDENT frequency and severity rates in small plants are roughly double those of large plants, and the smaller the plant the higher the accident rates, G. E. Johnson, assistant chief of the Division of Industrial Safety of the State of California, has pointed out.

The small plant owner may be unable to afford a safety engineer charged with nothing but accident prevention, but he cannot afford to be without a safety program, according to Mr. Johnson, and the owner himself must direct and guide the program. He underscored the importance of safety by pointing out that in the small plant one bad accident can wipe out several years' profits. He stressed also that "little good is accomplished by safety propaganda in irregular and infrequent doses . . . safety mindedness is achieved only by the constant attention to safety in every phase of the day's work."

Where solvents are used, "safety in every phase of the day's work" requires:

1. Knowledge of the nature of the solvent employed. The manufacturer's label usually provides information on these properties. Such information should also be put on any small containers of solvent withdrawn from the original drum so that the facts are kept before workers using these containers.

2. Where solvent is used constantly or frequently, properly engineered systems and equipment to prevent escape of solvent vapor into the working

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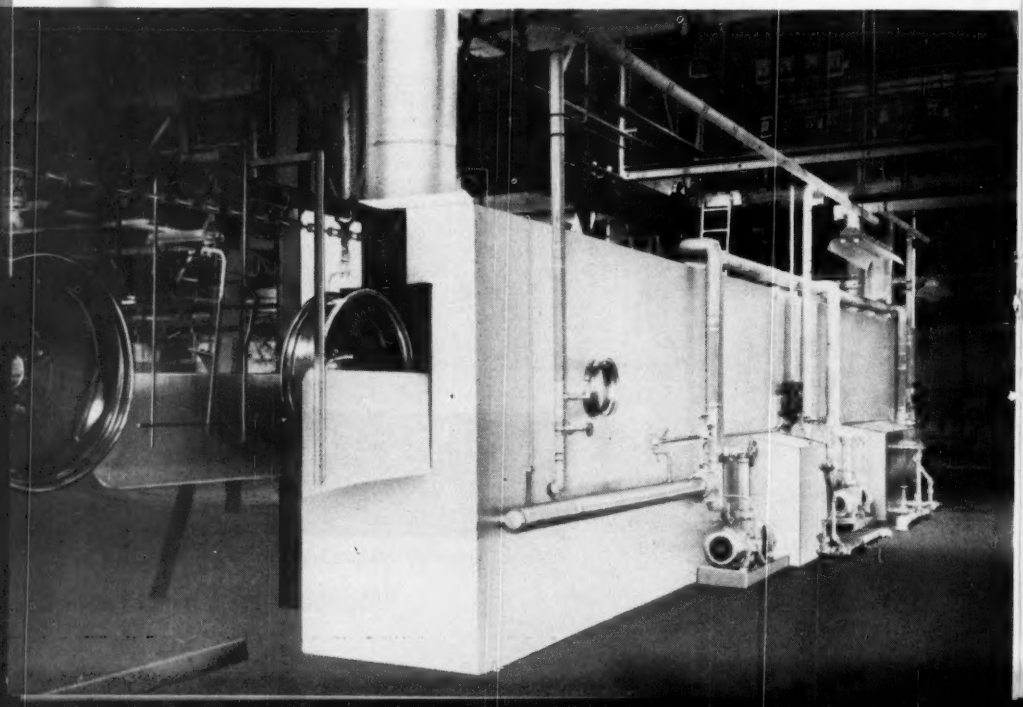

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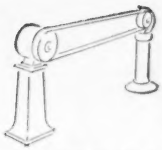

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A

B

• The coated abrasive belt cuts cooler because of the longer interval between work contacts.

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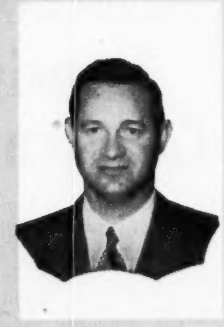
Spotlighting FINISHING Progress

High Temperature Heat Resistant Organic Coatings

PRESENTED before the recent 97th meeting of the Electrochemical Society, held in Cleveland, was a report on new organic coatings for high temperature use.

Work conducted at the University of Louisville Institute of Industrial Research and reported in a paper prepared by R. A. Williams, I. H. Lutz, and W. H. Hayne has resulted in a protective coating, with the application properties of an ordinary baked finish, which is capable of withstanding prolonged exposure to temperatures above 800 deg. F. Basically, the work involved the development of a satisfactory pigment-vehicle combination that would satisfy the above requirement, yet have conventional application characteristics. The study was carried out as a part of research performed for the Navy Department, Bureau of Aeronautics, U. S. Government, at the above Institute.

The research workers reported that existing organic materials for use as vehicles for heat resistant coatings are relatively few in number. The synthetic resins developed in recent years, while possessing definite advantages over older vehicles, are not satisfactory for use at temperatures above 450 deg. F. for extended periods of time. The nature of these resins causes them to char or volatilize if exposed to higher temperature for long periods.



By DR. ALLEN G. GRAY

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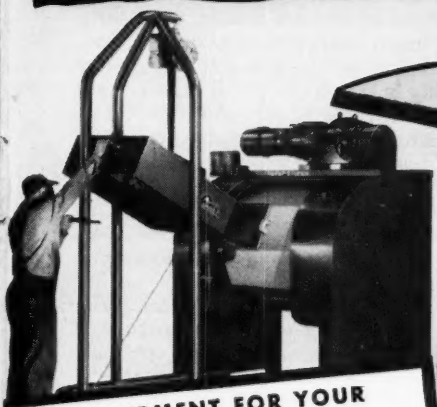

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The silicone resins which have recently become available possess outstanding heat resistance as compared with conventional organic vehicles. However, it was pointed out that this investigation showed these materials to possess certain undesirable properties. The silicones do not air dry to a tack-free condition, and, after baking, silicone resins are frequently brittle. The tackiness of the coating was stated to be due to the fact that silicones are high temperature polymerizing substances; thus, air drying at room conditions does not give temperatures high enough for satisfactory polymerization. One possibility of improving the drying characteristics, while retaining the advantages of the silicones, was that of combining glyceryl phthalate alkyd resins with the silicones. It was thought that a coating suitably prepared from this combination would retain the temperature resistance of the silicones, with the air drying, flexibility, and toughness of alkyds.

Pigments

The use of organic materials as pigments was precluded in a coating capable of withstanding 800 deg. F., because at this temperature existing organic pigments decompose or volatilize. It was pointed out that the only possible materials suitable for pigments were certain metals, their salts, and inert, inorganic substances. Consideration of the possible substances falling in this latter group showed that those worthy of investigation were aluminum, zinc, cadmium, tin, mica, and possibly a few others. Aluminum pigments have good heat resisting qualities, and, because of their leafing characteristics, generally give good corrosion and moisture resistance. Zinc is advantageous for use on low carbon steel because of its ability to diffuse into the crystal structure of the steel. Cadmium and tin are

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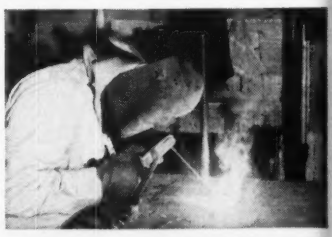

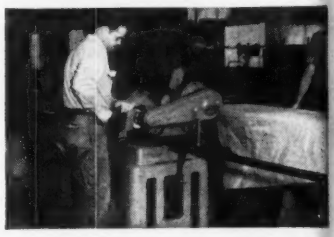

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TABLE I

Silicone-Glyceryl Phthalate Coatings Containing Aluminum

Composition of Vehicle (parts by weight)	Pigment	Coating Thickness (mils)	Appearance After 16 hours at 800 deg. F.	Bend on Heat Tested Panel	Washing in Spray
Glyceryl Phthalate (G.P.)	Aluminum		Very poor		
23 G.P., 2 Silicone	Aluminum	0.5	Fair	Fair	Rusted 24 hours
21 G.P., 4 Silicone	Aluminum	0.6	Good	Good	Rusted 24 hours
18 G.P., 7 Silicone	Aluminum	0.6	Good	Good	Rusted 24 hours
15 G.P., 10 Silicone	Aluminum	0.7	Good	Good	Rusted 24 hours
10 G.P., 15 Silicone	Aluminum	0.7	Good	Fair	Rusted 48 hours
7 G.P., 18 Silicone	Aluminum	0.6	Good	Fair	Rusted 200 hours
4 G.P., 21 Silicone	Aluminum	0.7	Good	Failed	None
2 G.P., 23 Silicone	Aluminum	0.6	Good	Failed	
15 G.P., 10 Silicone	Aluminum	3 coats 1.5 total	Good	Good 1 inch	Good 300 hours

NOTE: All samples were between 0.5 mil and 1.0 mil in thickness. The silicone used was Dow-Corning No. 802.

known to possess good weathering ability and appear sufficiently heat stable. In the selection of pigments for use, consideration of possible adverse effect on vehicles was necessary. Since silicone and alkyd resin vehicles were under consideration, the polymerization and drying activity of the pigments had to be reviewed.

Test Methods Used for Experimental Coatings

Coating formulations to be evaluated were prepared in the conventional manner. The desired pigments were ground with a small amount of vehicle. When satisfactory dispersion had been obtained, the remainder of the vehicle was added and thoroughly mixed. The coatings were applied by spraying on solvent cleaned, emery polished panels, cured, and fired at 800 deg. F. Those coatings capable of withstanding this temperature for 6 to 8 hours were tested by quenching, bending, and exposure to artificial weathering. Quench tests were performed by quenching the coated panels in cold water from 800 deg. F. Bend tests were performed by bending over a conventional mandrel. Weathering tests were carried out in both salt spray and accelerated weathering units.

Formulations Tested

In the course of the study, preliminary investigations were undertaken using silicone resins alone and with aluminum pigmentation. It was reported that although the silicones were characterized by good heat stability, they were found to possess certain undesirable advantages. They did not withstand temperatures above 500 deg. F.; in addition, after baking the coatings were rather brittle.

Tests were continued using blends of silicone resins and alkyd resins to determine if such a combination would improve the characteristics of both materials. At the same time, aluminum was introduced as a pigment. Test results obtained with these coatings are given in Table I. Good heat resistance and curing qualities were demonstrated.

The study also included an investigation of carbonizing vehicles. Several different mixtures of metallic powders were investigated for fusing characteristics. Indications were that the best fusing mixtures were those

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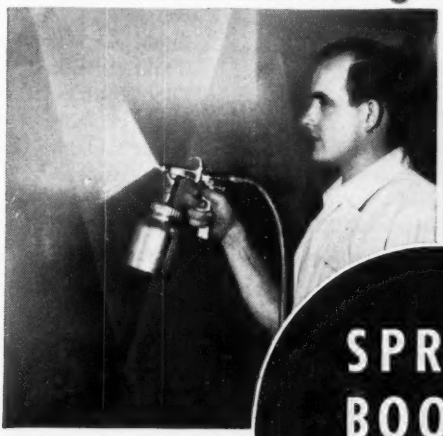

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TABLE II

Coatings Containing Tin, Aluminum and Zinc

Composition (parts by weight)	Appearance after 16 hrs. at 800 deg. F.	Bend on Heated Panel
2 Sn 2 Al 2 Zn	Good	Peeled
4 Sn 2 Al 2 Zn	Good	Slight chalking
6 Sn 2 Al 2 Zn	Good	Slight chalking
8 Sn 2 Al 2 Zn	Good	Slight chalking
10 Sn 2 Al 2 Zn	Good	Slight chalking
12 Sn 2 Al 2 Zn	Good	Slight chalking
6 Sn 2 Al 3 Zn	Good	Slight chalking
6 Sn 2 Al 1 Zn	Good	Some chalking
6 Sn 1 Al 4 Zn	Good	Slight chalking
6 Sn 1 Al 6 Zn	Good	Very slight chalking
6 Sn 1 Al 10 Zn	Good	Good
6 Sn 6 Zn	Good	Good
6 Sn 3 Al	Good	Chalking

NOTE: Vehicle used was heat reactive phenolic spar varnish 30 parts.

containing tin. Systems containing tin, almuinum, and a third metal were tested. Tin, due to its low melting point, acted as a carrier for the other metals in the pigment. Aluminum was desirable because it assisted in suspending the other metallic pigments and at the same time aided in weather and corrosion resistance. Zinc was used as the third component in the pigment because of its diffusivity. Various formulations were investigated using a heat reactive phenolic varnish vehicle containing various amounts of tin, zinc and aluminum. Typical formulations investigated with the results obtained are given in Table II. It was reported that coatings of this type, containing aluminum, zinc, or tin as pigments, satisfactorily passed the temperature and bending tests. However, the coatings had severe erosion tendencies, as evidenced by the "washing" of the coating after 100 hours' exposure in a water spray cabinet.

The studies were extended to include an investigation of cadmium as an additional pigment in an aluminum-zinc type of coating to improve the water spray resistance. It was found that cadmium in aluminum-zinc pigmentation definitely improved weathering and at the same time had no noticeable adverse effects on the heat resistance of the coating.

Thus, the studies showed that each of the two coatings, namely, the zinc-aluminum-cadmium heat reactive phenolic material and the aluminum pigmented silicone-alkyd resin, had advantages and disadvantages. Those coatings containing metallic pigments in a heat reactive vehicle definitely withstood temperatures of 800 deg. F. and had good corrosion resistant properties. However, this coating was soft and had poor abrasion resistance; although it would protect the metal surface from corrosion, it showed a severe "washing" or erosion tendency when exposed to weathering tests. The silicone-alkyd resin coating was temperature resistant, abrasion resistant, and had a hard surface. Although this coating composition was reported to have good rust preventative qualities, its application had to be carried out in a manner to give a thin coating, if curing was to be accomplished in a reasonable time. As the film thickness of

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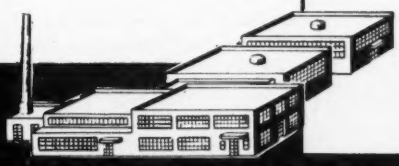

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the coating decreased, difficulty was encountered in obtaining a completely continuous film. Partial permeability permitted increased corrosion of the base metal.

Further studies indicated the desirability of using a "two coat" system to take advantage of the outstanding properties of both coatings. In such case, with the phenolic undercoat containing some zinc pigmentation, the zinc would tend to diffuse into the crystal system of the steel surface, giving good weather resistance and a binding of the undercoat to the base metal. Application of the pigmented silicone-glyceryl phthalate topcoat in a thin film would give a hard, abrasive resistant film. It was thought that this top coat would improve weather and corrosion resistance of the entire system. Data on the recommended heat resistant coating are summarized below:

Primer Coat

1. Composition: (parts by wt.) 5 zinc, 1 aluminum, 2 cadmium, dispersed in 30 parts of heat reactive phenolic varnish.
2. Application: Using the material as formulated, after thorough stirring, spray a uniform coat of approximately one mil thickness on solvent cleaned, emery polished or sandblasted surface.
3. Baking schedule: Bake the coated parts for not less than 30 minutes at 30 deg. F., minimum. No air drying is necessary. If the parts are air dried an hour or more, the aluminum baking temperature can be 200 deg. F.

Finish Coat

1. Composition: (parts by wt.) 6 aluminum, 10 silicone DC 802, 15 glyceryl phthalate.
2. Application: The required amount of glyceryl phthalate is added to the silicone-aluminum mixture. The two materials should not be mixed until ready for application. The composition should be stirred

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to a smooth consistency. For spray application, it should be diluted with a small amount of toluene. Spray a smooth, continuous film of this top coat (approximately 0.5 mil) over the primer. Film thickness of the top coat is critical; must be within 0.5-0.7 mil.

3. Baking schedule: The coated parts may or may not be air dried; however, baking must be carried out at 300 deg. F. for not less than 2 hours.
4. The coating may be subjected immediately to the desired temperature of 800 deg. F.

It was reported that this coating was tested at 800 deg. F. for periods over 300 hours with no failure. In addition no harmful effects were noted when the coating was heated in oil at 300 deg. F. for 10 hours and in toluene at 200 deg. F. for five hours.

Work was also carried out to develop a single coat blue coating and a single coat olive drab coating, both to be applied to stainless steel. The blue coating had the following composition:

0.40 part by weight cadmium powder
4.00 parts by weight Ferro enamel blue oxide 3203
0.75 part by weight Ferro enamel green oxide 3630
2.75 parts by weight Drakenfield black oxide
1.00 part by weight water ground mica
33.00 parts by weight silicone DC 802
0.53 part by weight lead naphthenate

This coating was applied to stainless steel as a single coat system and showed superior heat, weather, and corrosion resistance.

The olive drab heat resistant coating had the following formulation:

5.00 parts by weight ilmenite (The ilmenite used was ground and

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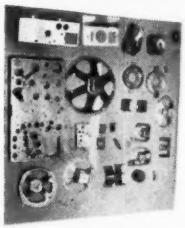

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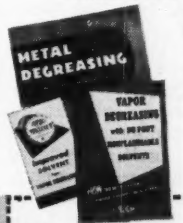

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20.00 parts by weight silicone DC 802
0.46 part by weight lead naphthenate (24 per cent)

This coating was applied to hydrochloric acid etched stainless steel panels which had been coated with the base coat given above. The coating was cured in the usual manner and fired at 800 deg. F. It was reported that the coating gave unusually good color retention, heat resistance, and abrasion resistance. The weather resistance, after firing at 800 deg. F., was stated to be outstanding. Panels heated at 800 deg. F. for 40 hours were exposed to water mist for a period exceeding 2000 hours with no corrosion or rusting.

* * *

Metal Cleaner Efficiency

ALTHOUGH each metal finishing job has its own cleaning requirements, it is a recognized fact that the physical and chemical nature of a metallic surface has a marked effect upon the quality of any coating applied to the surface. More and more it is being realized that the production of high quality protective coatings is dependent upon the proper and thorough cleaning and conditioning of the surface of the base metal. The presence of grease, corrosion products, dirt, and extraneous material affects the continuity of coatings whether of metallic or organic nature.

In discussing cleaning in the plating room before the recent 1950 Annual Educational Meeting, Toronto (Canada) Branch, American Electroplaters' Society, Mr. Edwin C. Rinker, Bart-Messing Corp., Brooklyn, stated that one common cause of

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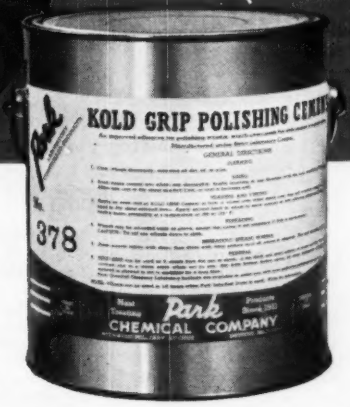

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trouble in metal cleaning is due to the plating supervisor's acceptance of everything that comes into his department, regardless of its condition. Some materials may be difficult or impossible to remove with the alkaline cleaner being used for the regular production work. The importance of satisfactory precleaning by accepted present-day methods and of properly analyzing and testing the cleaning requirements for parts in each specific situation was emphasized.

The lack of proper equipment was another factor pointed out by Rinker as contributing to poor cleaning efficiency. It is important that the plating department convince management of the significance of the cleaning operation in the overall production sequence, so that proper equipment may be installed and an efficient job done. An example cited was the lack of proper rinse tanks following the cleaning operation. Figure 1 shows a diagrammatic sketch of one type of electrolytic cleaning tank that has been recommended. Figure 2 shows cigarette lighters going through cleaning and plating cycle. Figure 3 shows alkaline cleaning and rinse tanks, and tests being conducted on cleaner.

Rinker emphasized that the rinse should be applied to the work as soon as it comes from the cleaner tank, and the cleaner solution should not be allowed to dry on the work before rinsing. The use of a proper sequence in the cleaning operation and proper rack design for the parts being handled were also cited as being important for best results.

Certain tests can be made in the laboratory to screen out poorly designed alkaline cleaners. In a discussion of the principles of preparing metal surfaces for electroplating, presented at Wayne University, Detroit, Dr. Walter R. Meyer, Enthone, Inc., suggested that the first test that

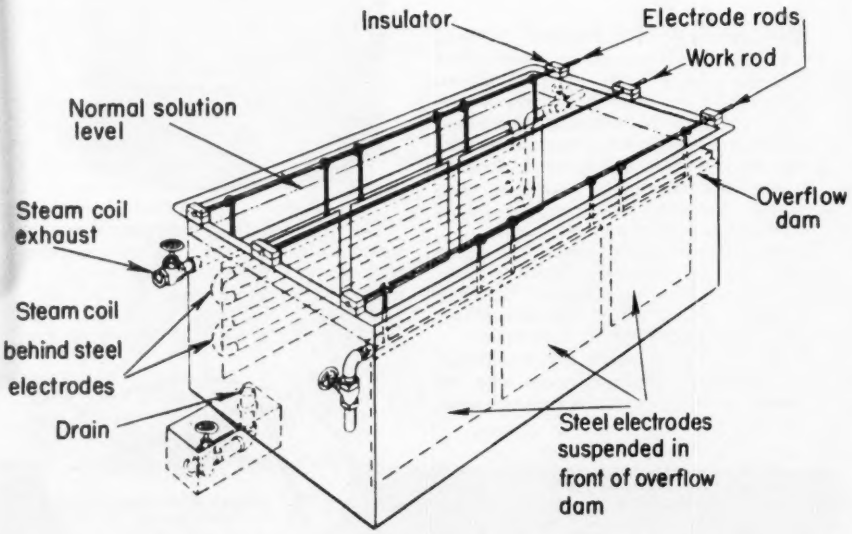
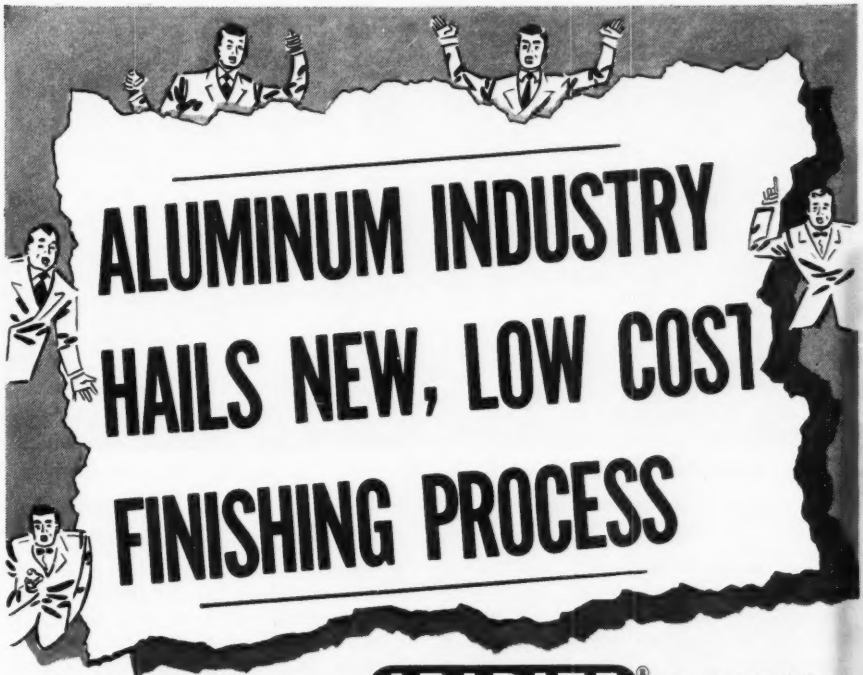


Fig. 1—Diagrammatic sketch of one type of electrolytic cleaning tank, showing recommended arrangement of accessories.
(Illustration courtesy "American Machinist")



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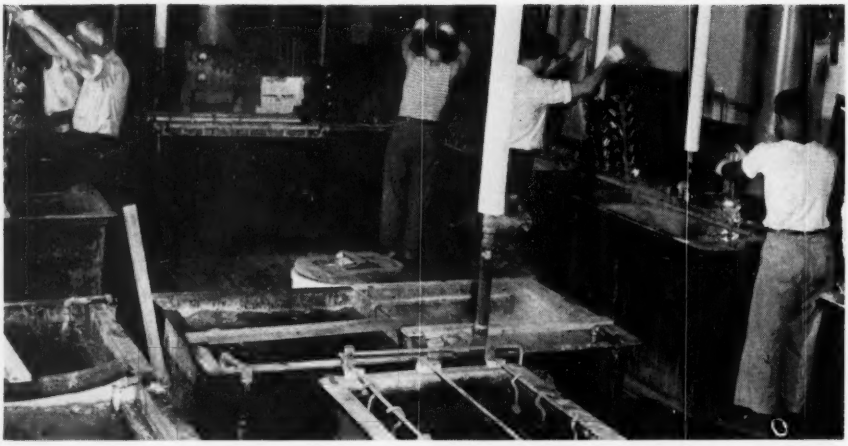

Fig. 2—A plating department in which cigarette lighters are processed through an alkaline cleaning and plating cycle.
(Photo courtesy Royal Plating and Polishing Company, and Oakite Products, Inc., New York 6, N. Y.)

should be made is a determination of the ability of the cleaning solution to remove non-saponifiable material. Panels 2 x 3 inches should be cleaned thoroughly and abraded with fine emery to a uniform surface. They are then coated with No. 50 engine oil, made by dissolving one volume of oil in one volume of safety solvent meeting Stoddard's Solvent specifications. The panel is allowed to air dry until the solvent has evaporated, then baked in an oven for 30 minutes at 150 deg. F. to remove volatile material. Cleaning tests should then be made with these contaminated panels, first by soak cleaning, then cathodic cleaning, and finally anodic cleaning.

Dr. Meyer recommended 10 amp /sq. ft. as the preferred current density to use on the electrolytic cleaning tests because differences in alkali cleaners will be more evident at low current densities, and low current density areas are the hardest to clean. One test suggested to indicate complete cleaning is the "water-break" test. In this test the panel should be rinsed in flowing water but not under the full pressure of a hose. It is then examined and if the water breaks from the surface in separate areas, it is not clean. Cleaning is continued until no water breaks appear, or until water will not break for at least one minute.

However, the water-break test should not be the sole criterion for determining whether or not perfect cleaning has been done. A supplementary test suggested by Dr. Meyer was that after the panel had been cleaned to no apparent water break, it should be immersed in 10 per cent sulfuric acid at room temperature for about 30 seconds to remove any trace of oxide, following which it should be rinsed thoroughly and then bright nickel plated. If solid dirt or oil is not completely removed, a poor plate will result. According to Dr. Meyer, solid dirt will show up as a haze under the plate, and oil will cause poor adhesion which will become evident on bending the panel. The presence of solid dirt can be made more noticeable by making a "criss-cross" on the panel, after cleaning, with a clean piece of rubber. If no "criss-cross" is evident after bright

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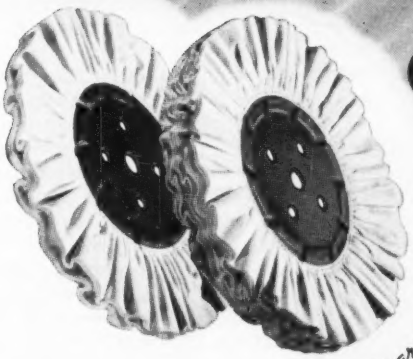

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nickel plating, the surface is definitely free of any loose solid dirt.

George B. Hogaboom has pointed out that the surface of steel may show no "water breaks" after chemical cleaning and yet have a surface condition that prevents good adhesion of an electroplate. ("Proc. Am. Electroplaters' Soc."—1948.) A simple test which shows whether a surface of steel or iron is chemically clean, according to Mr. Hogaboom, consists of an ordinary copper sulfate dip, conducted at room temperature. The composition that has been found most reliable is a solution of 5 oz./gal. copper sulfate and 1 fl. oz./gal. sulfuric acid. C.P. chemicals and distilled water should be used in preparing the dip.

Perfect cleanliness is indicated when the resultant coating of copper is clear, semi-bright, of good color, free from spots, and strongly adherent to the steel. It was stated that with even the slightest film of oil or grease on the steel, the copper immersion coating will not be adherent. Also, if a soap film remains on the steel after the cleaning process, the copper coating will appear dull and not strongly adherent. Any oxide on the steel, whether visible or invisible, adversely affects the character of the copper coating and its adhesion to the steel. The presence of any substances such as resins or silica, such as might be left by the alkaline cleaning operation will cause imperfections in the copper coating.

Spring has developed the spray-pattern method for cleaner evaluation. In this test method, steel panels are soiled, cleaned, and r i n s e d under standard conditions and then sprayed with water by an atomizer or spray gun. Water condenses as droplets on residually-oiled areas, providing a spray-pattern which is sketched on paper ruled into 100 squares. The number of squares covered with a continuous film of water is determined for five test panels and the average is called the "cleaning efficiency index."

In a recent discussion of the process of oil removal from a metal surface, based on work conducted in the laboratories of the Pennsylvania Salt Manufacturing Company, Spring has presented data to show that attraction of the oil for the m e t a l is reduced by the influence of the active components in the cleaning solution. This results in the formation of an almost spherical

Fig. 3—A cleaning setup consisting of hot alkaline cleaning tank and necessary water rinse tanks; tests are being conducted on the cleaning solution.
(Photo courtesy Cincinnati Rustproof Co., and Oakite Products, Inc., New York 6, N. Y.)

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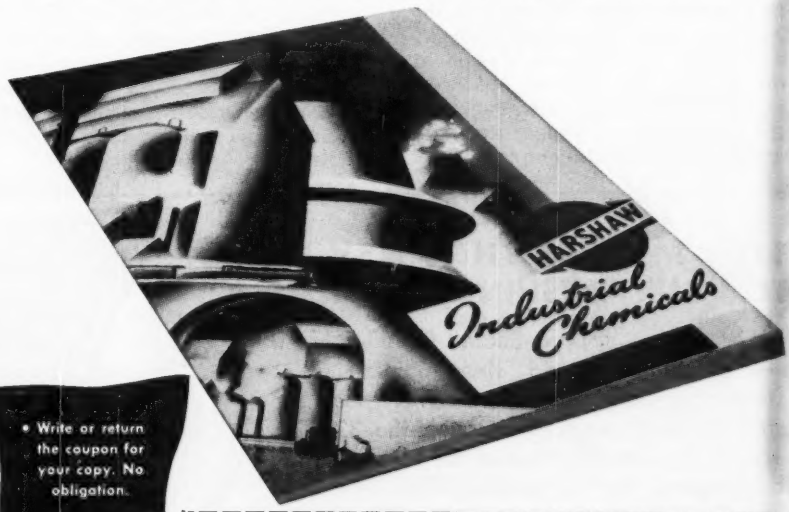

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oil globule. As cleaning progresses, this globule becomes attached to the metal at a relatively small area; eventually this area is reduced to practically point contact and the globule floats freely from the surface. It was pointed out that during the latter stage of the cleaning operation, mechanical agitation is highly instrumental in displacing the oil globules from the surface and thus greatly facilitates the cleaning process.

A fluorescent method has been used for evaluation of the degree of cleanliness of metal surfaces. The method is based on the fact that mineral oils and animal and vegetable oils containing an oil soluble fluorescent dye exhibit fluorescence under ultraviolet light. After soiling, cleaning, rinsing and drying, the fluorescence of residual oil on test panels may be observed or photographed under ultraviolet light; the fluorescence is proportional to the amount of residual oil on the panels.

There are some general points that should be kept in mind when setting up tests to evaluate alkaline cleaners for production line finishing operations. In general, they should be electrolyzed hot for several days and cleaning tests run periodically to see whether there is any decomposition of the cleaner. In some cases, decomposition will give rise to poor detergency. In certain other cases, it may cause the formation of an insoluble residue on the work, that will be particularly noticeable after the bright nickel plating test. It is also a good idea to age the cleaner for a few hours before making the efficiency tests. The height and stability of the foam produced on the cleaner, when electrolyzed, should be considered because heavy foaming can render a cleaner unsuitable for certain plant setups. Cleaners should always be used at recommended concentrations, and on metals for which intended.

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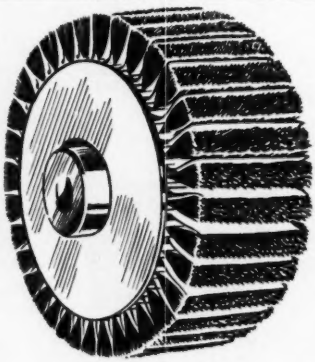

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NEWS of the Industry

A CONFERENCE OF TECHNICAL EDITORS, representing 60 technical and trade magazines serving industries in which Hercules chemical products are used, was held at the Experiment Station of **HERCULES POWDER CO.,** Wilmington, Del., on October 2 and 3.

The conference was opened officially on Monday evening, October 2, with a dinner at the Hotel Du Pont in Wilmington. After the dinner Theodore Marvin, director of advertising, welcomed the visitors to Hercules and introduced Charles A. Higgins, president of the company. Mr. Higgins reviewed briefly the history of the Hercules Powder Company and discussed its position in the chemical industry, outlining the changes which have been made as a result of the company's continued growth and progress. In connection with his discussion of the extensive research and development facilities of the company, which have made important contributions to the nation's plastics, lacquer, rayon, textile, and synthetic rubber industries, Mr. Higgins defined research as being "an organized effort to grow."

Mr. Marvin also introduced other officials of the company, after which a new Hercules color movie, "Problem—Solution—Result," was shown to the editors and Hercules executives.

On October 3 the visitors were taken to the Hercules Experiment Station. The opening session was held in the clubhouse where M. R. Budd, assistant director of advertising, welcomed the writers. A panel of "experts" briefed the editors on some phases of Hercules business. J. O. Small, manager of Product Applications, Synthetics Department, discussed protective coatings, touching upon the products of various departments. P. F.

Fig. 1—An aerial view of the Hercules Experiment Station.

Fig. 2—Hercules President, Charles A. Higgins, addressing the editors.

Neumann, manager, Technical Service, Paper Makers Chemical Department, talked about products for the paper industry, and A. R. Olsen, manager of Plastics Promotion, Cellulose Products Department, spoke on plastics. Gordon Dittmar outlined the work done in several fields, such as textiles, insecticides, and with new products like rosin amines. The role of the Research Department was explained by Dr. R. W. Cairns, and the position of the Experiment Station in the company setup was defined by Station Director, Dr. Ray Schultz.

Breaking up into small groups, the editors then toured the Experiment Station, accompanied by Station guides. They visited the rubber lab, varnish lab, flame-proof compositions, surface-active compounds, plastics, Vinsol, and paper. They visited the rubber lab, varnish lab. machine shop, glass blowing shop, and the explosives area. They saw the large-scale samples preparation lab, ore flotation, the phonograph record press, and the work of the Station's analytical division. The number of separate research and development laboratories included in this tour is indicative of the several fields and diverse interests of the Hercules Powder Company.

Following the tour of the various laboratories, Mr. Budd conducted a brief question and answer period, after which a luncheon was served at the Hercules Country Club, located on the Experiment Station grounds.

In the afternoon visitors were shown the high-pressure laboratory used to study chemical reactions at pressures as

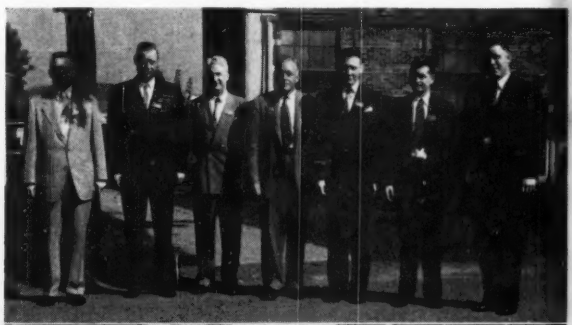


Fig. 3—One group of visitors beginning a tour of the Station. (Left to right) Henry Sholly, "Fairchild Publications"; Norman Johson, "American Dyestuff Reporter"; M. E. Lerner, "Rubber Age"; William Auchincloss, "Oil, Paint & Drug Reporter"; Ezra A. Blount, PRODUCTS FINISHING; E. P. McGinn, "Paper Trade Journal"; Harvey Taufen, Hercules Experiment Station.

Fig. 4 — Vinsol Laboratory. (Left to right) W. O. Edwards, Hercules; William Bradbury, "Mechanization"; John C. Bumstead, "Engineering News Record"; Anthony Conway, Hercules; Henry Perez, "Construction Methods"; H. McCann, "Modern Plastics"; W. O. Holmes, Hercules; F. C. Adams, "Paint, Oil & Chemical Review"; Homer Haggard, Hercules, addressing group.

Fig. 5—Sample Preparation Laboratory. (Left to right) V. Laughner, "Product Engineering"; Frank McCarthy, "Food Industries"; Don Seiwell, "Paper Industry"; Ralph David, "Plastics Industry"; Roger Bolz, "Machine Design"; V. C. Bidlack, "Official Digest" (Paint & Varnish Production Clubs); Walter Murphy, American Chemical Society Publications.

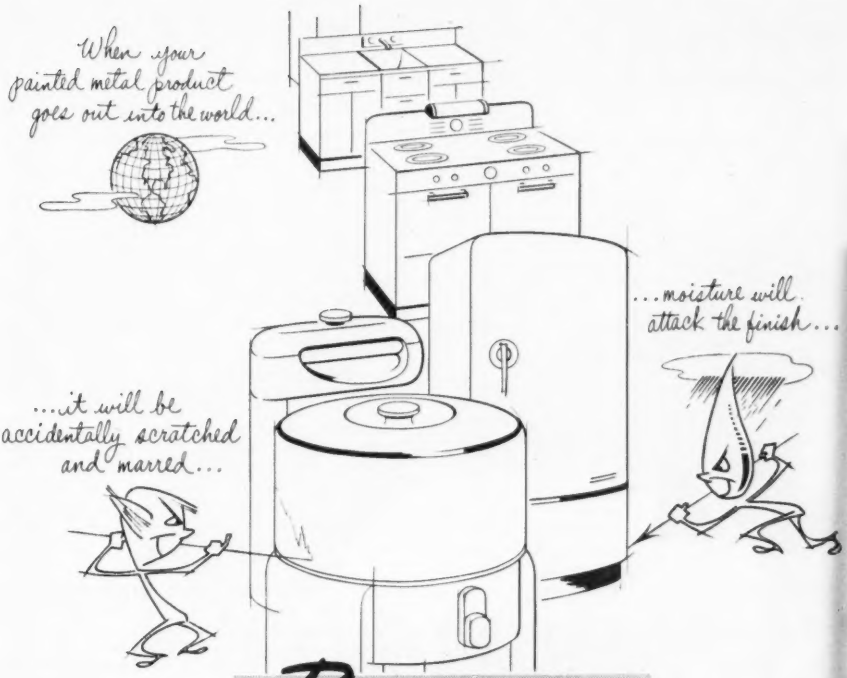
high as 25,000 p.s.i. and temperatures up to 752 deg. F. In this laboratory it is possible to develop, on a pilot plant scale, new and improved processes for chemicals now in production, or new chemicals to be manufactured from present raw materials. This work has lead to the development of many products used in the formulation of protective coatings.

A demonstration of the application of lacquer by the newly developed Hot Lacquer Process concluded the tour of the Experiment Station. It was pointed out that in the Hot Lacquer Process heat is used instead of added volatile lacquer ingredients to reduce the material to spraying consistency. Since hot lacquer has a higher solids content than the conventional material, the number of coats required to finish a product are fewer and the thickness of coating obtained in each pass of the spray gun is greater. The finish has less tendency to sag and exhibits improved flow-out properties, so that orange peel is eliminated. The patent covering the use of heat in the application of lacquer has been dedicated to the public, so that the finishing industry may now benefit freely from the advantages inherent in this process.

NEW POSITIONS

Irving Flaumenhaft, president of the Lacquer and Chemical Corporation, has

Fig. 6 — Lunching at the Country Club. (Left to right) Robert W. Little, Hercules; Kenneth Howry, "Daily News Record"; William Bradbury, "Mechanization"; T. Batchelor, Hercules.
(Photos courtesy Hercules Powder Co., Wilmington, Del.)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BONDERITE—Corrosion Resistant Paint Base • PARCO COMPOUND—Rust Resistant • PARCO LUBRITE—Wear Resistant for Friction Surfaces

announced the appointment of **SAM RUGGERI** as project engineer. Mr. Ruggeri was formerly with the Centro Research Laboratories.

Announcement has been made by W. F. Newbery, director of sales, Detrex Corp., Detroit 32, Mich., that **GORDON A. JACOBS** has been appointed representative in charge of the Dallas Division, which includes the States of Texas, Louisiana, Oklahoma, and Arkansas.

Gordon A. Jacobs

Mr. Jacobs is a graduate engineer and has had broad experience in marketing, field servicing, and consulting on Detrex processes, including solvent vapor degreasing, alkali and emulsion cleaning, and rust-proofing.

Bruce A. Fleming, vice president in charge of sales of Edwin L. Wiegand Co., Pittsburgh, Pa., has announced two appointments in the company's sales department. **C. F. KREISER,** formerly assistant sales manager, becomes general sales manager. **W. J. ARNOLD,** formerly manager of industrial applications, is now industrial sales manager.

W. J. Arnold

Mr. Kreiser, a graduate of Duke University, joined the Wiegand Company in 1946 as a sales engineer following wartime service as a naval radar officer. Mr. Arnold, a graduate of the University of Pittsburgh, has been associated with the company since 1944.

At a meeting held recently of the board of directors of The Monroe Sander Corporation of Long Island City, manufacturer of industrial finishes, synthetics and chemicals, **HAROLD R. TANNEY** was elected vice president in charge of production.

Mr. Tanney, formerly assistant treasurer, will be in complete charge of the manufacture of all company products for consumer and government use.

H. C. SIXT has been named technical assistant to Fred P. Hauck, vice presiden of the Michigan Abrasive Company, according to an announcement by Max C. Jones, president.

Formerly a process engineer at the Carborundum Company, Mr. Sixt will be directly responsible to Mr Hauck in the handling of tecĥnical problems in connection with coated abrasives in the automotive and steel industries.

Upon completion of a research project at Raritan Arsenal, located at the Army's Ordnance Depot, Metuchen, N. J., **JEFFREY R. STEWART** has been transferred to the Bureau of Yards and Docks, Department of the Navy, Washington 25, D. C. Mr. Stewart previously spent six months preparing a technical

in BURNISHING MATERIALS

the BALL rolls 'em SMOOTH

For smooth, even burnishing of flat and gently curved surfaces . . . use Abbott "Eclipse" or "Abco" Burnishing Balls. They're sure to do the job right!

Abbott Burnishing Materials, available in five shapes — Ball, Ovalball, Cone, Diagonal, Pin — are scientifically designed to make effective contact on metal stampings or castings of any size and shape. Each piece is a burnishing tool made from Abbott's high quality bearing ball steel. Each is deep hardened and polished to a mirrorlike, glasshard finish. For *better* all round burnishing . . use Abbott!

Some parts require a special mixture of Abbott Burnishing Materials. Send for catalog — No obligation.

THE ABBOTT BALL COMPANY

1064 New Britain Ave.,
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ABBOTT
the all round ball

manual for the Department of the Army.

Author of the National Paint Dictionary, Mr. Stewart was formerly associated with Dr. Henry A. Gardner as a research chemist with the National Paint, Varnish & Lacquer Association.

Chadeloid Corporation and New Wrinkle, Inc., announce the addition of **RUSSEL D. HAMILTON** and **GEORGE A. CONRAD** to their technical-sales staffs.

Mr. Hamilton, whose headquarters will be in Chicago, will travel the Midwest, and will be available to licensees at all times for technical assistance.

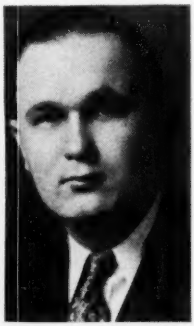
Mr. Conrad will have his headquarters at Lyndhurst, New Jersey, and will contact licensees in the East.

COMPANIES

DARCO CORPORATION, formerly a subsidiary of **ATLAS POWDER COMPANY,** has become the **DARCO DEPARTMENT** of that company in a recent merger.

Product, personnel, and distribution will be continued. Darco plant expansion at Marshall, Texas, is being pushed to the earliest possible completion.

BINKS MANUFACTURING COMPANY, maker of spray guns and industrial finishing equipment, announces the opening of a new and centrally located office at 2041 West State Street, Milwaukee 3, Wisconsin. Approximately three times as large as its former Milwaukee office, it includes an attractive display room where Binks industrial spray finishing equipment is exhibited.



H. J. Dueno

The office is managed by H. J. Dueno who is well-known in the finishing field. Mr. Dueno directs Binks sales in Wisconsin, Michigan peninsula, Minnesota, North and South Dakota, and the northern parts of Iowa and Illinois.

THE LOWE BROTHERS COMPANY, Dayton, Ohio paint and varnish maker, recently conducted a five-day Industrial Finishes Seminar for its industrial salesmen.

The meetings, headed by Edward F. Teyber, Industrial Division manager, covered many phases of creative selling, new product development, and the latest techniques of spray application of Lowe Brothers Industrial Finishes. Assisting in the presentations were J. B. Woods, Industrial Division sales manager; E. W. Fasig, general superintendent; B. R. Hanson, director, Technical Service Laboratory, and Dr. J. M. Purdy, chief chemist, Chemical Laboratory.

A new lacquer finishing technique that is attracting considerable attention; a chemical resistant paint base; and synthetic resins manufactured under statistical quality control methods will be featured in **HERCULES POWDER COMPANY'S** exhibit at the 1950 Paint Industries Show in Chicago, November 9-11.

The exhibit will exemplify the wide variety of chemicals for the paint, varnish, and lacquer industries which are produced by Hercules.

Pre-Saponified

Composition

Cleans Better, Faster

Not just an ordinary buffing and polishing agent but a tested and highly effective composition that washes absolutely clean regardless of the type of work.

TRY WONDERBAR NOW! See how its quick action saves time and combats high labor cost.

Metal Cleaners — Plater's Supplies
Deodorants—Disinfectants

THE PURITAN MFG. CO.
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CHROMALOX ELECTRIC RADIANT HEATERS

Withstand Shock, Blows, Vibration, Moisture

With CHROMALOX Electric Radiant Heaters you "dial" the exact heat you need to fit the job in drying, baking, preheating, curing, degreasing and similar applications. CHROMALOX Radiant Heaters operate in low and high ambient temperatures, give glareless radiation in efficiently absorbed wave lengths. Easy-to-install without expensive conversion.

CHECK THESE ADVANTAGES

1. VARIABLE heat to suit the job.
2. UNIFORM heat—no hot spots.
3. EQUAL absorption by all colors.
4. ALL-METAL, nothing to shatter.
5. EASY TO FORM low-cost ovens.

THEN SEND FOR DETAILS

A free application file shows many proved ways to save time and money with these units.

EDWIN L. WIEGAND CO., 7552 THOMAS BLVD., PITTSBURGH 8, PA.

CHROMALOX IB-6 B

ELECTRIC HEAT FOR MODERN INDUSTRY

The new lacquer finishing technique, the "hot-lacquer process", is attracting widespread interest in the finishes field not only because of the economies it offers to the finishing industry but also because it offers that industry a means of by-passing the serious and ever-growing shortage of volatile ingredients.

In the hot-lacquer process, heat is used instead of volatile lacquer ingredients to make the lacquer thin enough to spray.

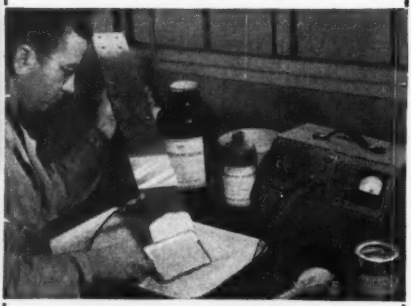
TRAINING COURSES

Plans are now being made to repeat for the third year the course on appearance measurements of materials which is given at the **HENRY A. GARDNER LABORATORY,** Bethesda 14, Md., under the direction of Richard S. Hunter, chief optical engineer. The course will be given at least three times between November 1 and June 30. One course is planned for November 27-December 1. Others will follow as applications are received to fill them.

Each course lasts one week and there are two lectures each day. Laboratory periods allow for work on different appearance-measurement instruments, preferably on specimens brought by the students. The primary aim of the course is to explain the appearance of materials with respect to physical causes, psychological appreciation, and psychophysical measurement. Lectures are also given on instruments, their components, and trouble shooting, and on basic techniques for preparing and handling materials for measurement.

Interested persons should contact Henry A. Gardner Laboratory, Inc.

Brush Electroplating for Many Uses



• Protective or decorative finishes • Touching-up damaged, defective or worn plating • Rust-proofing metal surfaces • Hard-plating wearing surfaces • Plates on practically all metals • Low cost . . . usable anywhere • Portable—you take the unit to the job.

Write today for Bulletin 148.

AJAX-CONSOLIDATED CO.
4607 W. 20th St. Chicago 50, Ill.

SOCIETIES

The **PHILADELPHIA BRANCH** of the **AMERICAN ELECTROPLATERS' SOCIETY** is holding its **ANNUAL EDUCATIONAL SESSION** and **BANQUET** at the Broadwood Hotel on Saturday, November 18.

Beginning at 1:30 p.m., the speakers will be: Dr. William Blum, chief, Electrodeposition Section, National Bureau of Standards, "Effects of War on the Electroplating Industry"; R. O. Hull, R. O. Hull and Co., Rocky River, Ohio, "New Ideas in Plating and Control"; and Arthur W. Logozzo, Nutmeg Chrome Corp., Hartford, Conn., "Hard Chrome Problems."

The banquet will be held at 7:00 p.m., followed by entertainment and dancing. Tickets are $5.00 per person.

The third annual varnish and paint chemistry symposium will be held at New York University College of Engineering on Saturday, November 18, Dean Thorndike Saville has announced. Jointly sponsored by the **COLLEGE OF ENGINEERING,** the **NEW YORK PAINT AND VARNISH PRODUCTION CLUB,** and the **NEW YORK PAINT, VARNISH AND LACQUER ASSOCIATION,** the one-day session will include three scientific papers and a colloquium on the subject "Protection of Submerged Surfaces."

Dr. Max Kronstein, adjunct associate professor of chemical engineering, will have charge of the arrangements for the all-day meeting and those interested in attending should contact him at the University's College of Engineering.

The **ANNUAL EDUCATIONAL PROGRAM** and **DECEMBER PARTY** of the **DETROIT BRANCH** of the **AMERICAN ELECTROPLATERS' SOCIETY** are being held Saturday, December 2, at the Statler Hotel.

The educational program, which begins at 2:00 p. m., will include the following speakers: Dr. George Jernstedt, West-

How to get Finer Finishes at Lower Costs

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Direct Motor Drive

TILTING TUMBLING BARRELS

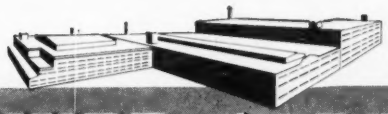
Available in Kiln-Dried Maple or Steel Shells

Process thousands of pieces at one time—faster, better and at lower cost—with Globe Precision Tumbling Barrels, dependable for 47 years. Globe's exclusive six-way work shifting motion cuts tumbling time and increases action. Speeds as low as 30 revolutions per minute assure finer finishes of non-ferrous metal parts. Motor is compactly mounted above the gear segment for space economy.

Free Experimental Service

Hupp's Experimental Engineering Laboratory can show you how to cut finishing costs. Just send samples of the parts to be processed along with a finished part. Write today! There's no charge or obligation.

Hupp Manufactures a Complete Line of Tumbling Barrels and De-Burring Machines.



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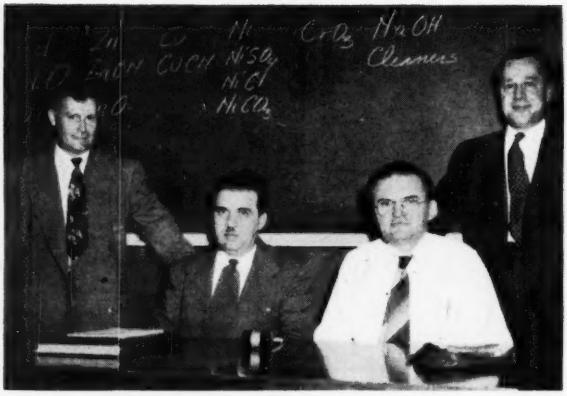

Vincent Mattacotti (right), executive manager of the Milwaukee Plating Co., Milwaukee, Wis., addressed the Chicago Branch of the American Electroplaters' Society on metals conservation at the August meeting. Others in the photograph are (left to right): J. M. Andrus, librarian, Paul Glab (Northwestern Plating Company), secretary-treasurer, and Dr. J. H. Monaweck, president, Chicago Branch.

inghouse Electric Company, "Applications of Wes-X Copper and P. R. Plating"; Harland V. Ogel and Dr. D. T. Ewing, Michigan State College, "The Distribution of Metallic Impurities in Nickel Deposits"; and a general interest talk by a prominent executive of the Ford Motor Company. Chairman of the Educational Session will be William J. Neill, national president of the Society.

The banquet and entertainment program will begin at 7:00 p.m. in the Main Ballroom of the Statler and will include top notch talent and one of Detroit's best dance orchestras.

Tickets for the banquet, at $7.50 per person, may be obtained from Carl E. Heussner, 552 Brookside Drive, Birmingham, Michigan.

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A Complete Line of Compounds Tailor-made to suit your particular requirements.

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meetings

OF INTEREST TO FINISHERS

Nov. 9-11. Federation of Paint and Varnish Production Clubs Convention, Congress Hotel, Chicago, Illinois.

Nov. 15-17. 62nd Annual Convention, National Paint, Varnish and Lacquer Association, Fairmont Hotel, San Francisco, California.

Nov. 18. Annual Educational Meeting, Philadelphia Branch, American Electroplaters' Society, Broadwood Hotel, Philadelphia, Pennsylvania.

Nov. 18. Third Annual Varnish and Paint Chemistry Symposium, New York University, College of Engineering, Bronx 53, New York.

Dec. 2. Annual Educational Meeting, Detroit Branch, American Electroplaters' Society, Statler Hotel, Detroit, Michigan.

Dec. 4-6. 1950 Winter Convention and Management Conference, Institute of Cooking and Heating Appliance Manufacturers, Netherland Plaza, Cincinnati, Ohio.

. . . . . are you only this far away from MORE APPLIANCE SALES?

Sales preference for *your* appliances may be only a matter of 2/1000 of an inch of thickness—the beauty and lasting quality of the finish! Buyers today have learned to expect the punishment-resisting, white-for-life characteristics made possible by the newest developments in synthetic resin finishes.

Kemclad* Appliance Finishes provide these qualities, accurately adapted to the needs of appliance manufacture. They *reduce production difficulties* (one user alone has applied over 86,000 gallons without technical or production problems) . . . *cut down rejects* (greater hardness with flexibility enables minor defects to be rubbed or "dinged" out after baking) . . . *reduce costs per unit* (high solids content with low viscosity makes finishing cost low for any given thickness of finish). Investigate—write The Sherwin-Williams Co., Industrial Division, Cleveland 1, Ohio.

*Trademark

TOUGH AND MARPROOF
Kemclad formulations include special ingredients to protect finish against marring, chipping or scratching.

HOT GREASE? NO HARM DONE!
Even hot grease won't damage Kemclad's gleaming white finish!

STAYS WHITE AND STAIN-FREE!
Kemclad Finishes aren't affected by food acids, weak alkalies, alcohols or other common household chemicals.

CLEANS EASILY . . . SAFELY!
Kemclad's smooth surface cleans easily with damp cloth, but withstands strong detergents safely.

SHERWIN-WILLIAMS KEMCLAD
APPLIANCE FINISHES
ANOTHER PRODUCT OF SHERWIN-WILLIAMS INDUSTRIAL RESEARCH

New • EQUIPMENT • MATERIALS • PROCESSES

Liquid Tripoli Compositions

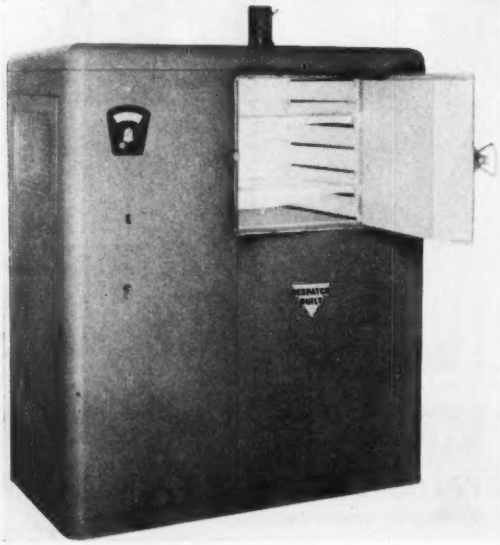
Acme 2-L-177 and 2-L-178 are the latest additions to the line of liquid tripoli compositions made by the Hanson-Van Winkle-Munning Co., Matawan, N. J. The compositions are oil-water emulsions.

Excellent cutting qualities are combined with an unusually high coloring ability for the degree of cut obtained, it is stated. Acme 2-L-177 is highly recommended for maximum cut and 2-L-178 for cut-color on such materials as brass, die castings, and aluminum, or wherever a general purpose tripoli would be used.

Laboratory Oven

A laboratory furnace has been developed by The Despatch Oven Co., 619 S. E. Eighth St., Minneapolis 14, Minn., to fit the expanded needs of testing laboratories in industry. The application of cross-flow convention heat with extra air volume speeds up preheat time, provides for good penetration of products in the work chamber, and reduces time for heat recovery after new loads, it is claimed.

Either direct gas-fired or electric, the CF line has a temperature range up to 850 deg. F., and provides for maximum heat control accuracy and work chamber uniformity. Swinging doors permit location of the furnace where less head room is available. Rounded corners and a gray wrinkle finish improve the appearance of the Despatch oven.



Despatch Laboratory Oven

Vincote Spray Booth Coating

Vincote, a vinyl-type liquid which dries rapidly and forms a plastic film with high tensile strength when sprayed on a booth wall, is manufactured by the Detrex Corp., P. O. Box 501, Detroit 32, Mich. According to the manufacturer, its characteristic of forming a highly cohesive film makes it a "tough" protective coating that is impervious to paint, enamel, lacquer, water, and so on. Its low adhesiveness makes for easy removal of the film and accumulated paint overspray from the booth wall when the booth is being cleaned. Vincote contains no solids, but a red dye has been placed in it so that one can easily see what portion of a wall has been coated and how thick the coating is being applied. Depending upon the thickness of application, coverage ranges between 250 and 400 sq. ft./gallon.

Vincote is blended to proper consistency for spraying as received in shipping container. Any type of standard spraying equipment that a customer is using for lacquer or paint finishes may be employed.

It is necessary to completely remove old paint or other booth coating materials before applying Vincote (to prevent any sagging or sticking of the coating).

A coating built up of two or three thin coatings is found best, especially if the metal surface happens to be slightly rough. In the time required to cover approximately 10 to 15 square feet with one coat, the starting point will be sufficiently dry for the application of a second coat.

As Vincote contains a volatile, flammable thinner, the same care should be used as in applying lacquers; namely, the material should be kept away from open flames and sparks.

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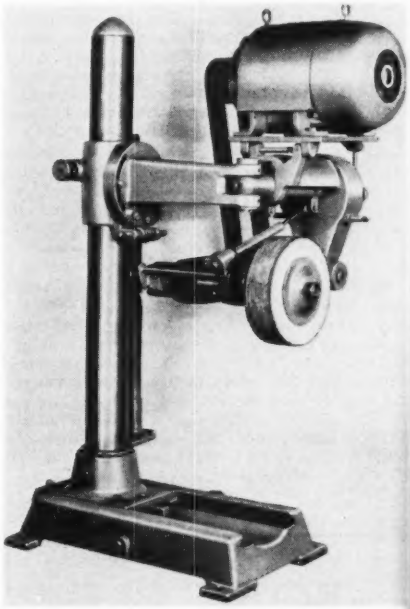
60 Series Polishing Head

A compact, universal polishing or buffing head, designed to economize on floor space but provide extreme versatility in use, has been announced by Murray-Way Corp., 3925 W. Fort St., Detroit 16, Mich. Known as the 60 Series, it will be available in two standard sizes: Number 61, rated at 10 to 15 h.p., and Number 62, rated at 5 to 7½ h.p. Both units will have the same design and features.

The head will operate either right or left-hand, without extra brackets or extensive mechanical adjustments. Simple



Murray-Way 60 Series Polishing Head

changeover can be made quickly and easily. Because of its extreme compactness, it will operate on 3-foot centers, thus greatly reducing the required diameter of dial tables and the length of conveyors and number of fixtures needed.

Special pneumatic controls assure constant, accurate work pressure automatically, the manufacturer states.

Electrofilm Graphite Processes

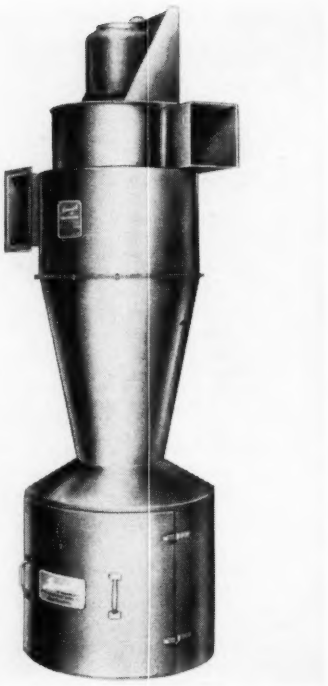
Processes that produce a solid film or "dry" lubricant impregnated into the surfaces of metals, plastics, rubber, and ceramics to reduce friction and wear are being offered by the Metal Finishing Division of the Pyrene Manufacturing Co., 10 Empire St., Newark 5, N. J. It is claimed that the highly desirable charac-

teristics of graphite are retained, throughout wide ranges in temperature, in a permanent film that is unaffected by exposure to solvents or weather.

These processes have proved in regular production their value for reducing wear in internal combustion engines and other moving parts. They are in use in disc clutches, brakes, gears, worms and splines. The electrical and aviation industries are employing them to reduce erosion and inhibit corrosion.

Hammond Cyclone Type Duskolectors

Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo, Mich., has announced the addition of two models to its line of Cyclone Type Duskolectors. Model CYO-6, as shown, is recommended for installations for exhausting air to the outside. Model CYB-6 is of the same construction but is fitted with a dust-proof bag. and is adaptable where conditions permit recirculating the air. Their large dust capacity, and 2 h.p. motor provide a heavy-duty dust collecting system for dust, grit, lint, saw dust, plastics, buffing compounds and so on.



Hammond Model CYO-6 Cyclone Duskolector

Capacity of both models is 1150 c.f.m.—velocity 5600 f.p.m. with 2 h.p. motor. Base is 26 inches in diameter and dust pan capacity is 10,620 cubic inches. Overall height is 86 inches, inlet size is 6 inches, and outlet size is 7 inches.

FOR SALE

85,000

AIR-COOLED BUFFS

(Slightly Used)

12" to 13" Diameter

1 ¼" Arbor

Samples Submitted

DETROIT 12, MICHIGAN

MICHIGAN BUFF CO., INC.

3500 GAYLORD AVENUE

Ipco Nitrometer-Acid Mask

Industrial Products Co., 2735 N. Fourth St., Philadelphia 33, Pa., has marketed a protective mask for use when repairing acid line breaks and on other jobs and operations where complete face, head, and neck coverage is required.

Known as the No. 7V Nitrometer-Acid Mask, it is manufactured with an aluminum frame to which is attached an electronically sealed hood of clear frosted Vinylite and cape. Lightweight and flexible, it permits freedom of movement and

Ipco Nitrometer-Acid Mask

comfort. It extends well down over the shoulders and is made full so that the mask may be turned up over the head when wearer is not exposed to the hazard.

The Nitrometer-Acid Mask is fitted with a headgear that adjusts comfortably to all head sizes. The window is of heavy gauge plastic (0.060 inch thick) for impact resistance. It may be quickly changed without the use of tools.

Improved Di-Phase Metal Cleaner

A simple method for making and using di-phase metal cleaners with very good detergency is based on having a system in which the water and solvent remain as separate layers. The solvent consists of a chlorinated solvent, such as trichlorethylene, to which is added mineral spirits to provide a final specific gravity greater than the water layer which remains on top of the solvent. Phosphates are frequently added to the water to help clean water-soluble dirt from the metals.

The efficiency of the system depends on the addition of Polyethylene Glycol 400 (Di Tri) Ricinoleate S-556U, about ½ per cent to the solvent. S-556U acts as an organic solvent wetting agent for the metals, helping remove grease and oils from the metals rapidly. Not only does it act as a preferential wetting agent, but also as an emulsifying agent when the metal parts are raised through the water layer, causing more effective removal of trace greases and other adhering dirt, according to the manufacturer, Glyco Products Co., Inc., 26 Court St., Brooklyn 2, New York.

Cleaning by this di-phase system is done simply by dipping the metal parts through the water layer into the solvent and then within a short time bringing them up through the water layer with a minimum of agitation or other mechanical cleaning methods. The system is not heated, thus avoiding difficulties with fumes, fire hazard, loss of solvent, and change in composition of the two phases.

Stokolite L-44 Dipper

Stokes Molded Products, Inc., Trenton 4, N. J., has introduced the Stokolite L-44 Dipper as a companion to the Stokolite Pail.

Made of Stokolite L-44 compound, which has a base of virgin rubber, the dipper is streamlined for lightness and has an efficient pouring lip and a well reinforced handle. The nature of the ma-

Stokolite L-44 Dipper in Use

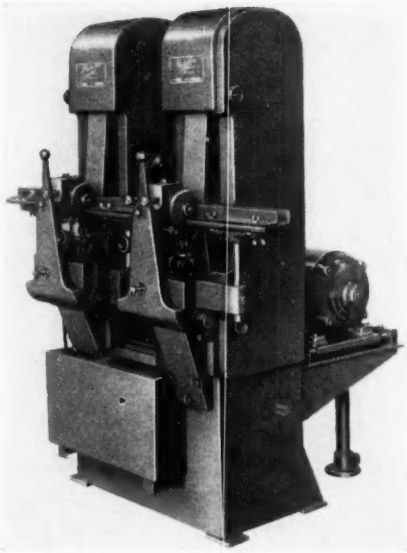
terial gives it unusually high resistance to shock, abrasion, heat, and chemical corrosion, and renders it practically indestructible, it is claimed.

According to the manufacturer, chemicals with which it has been successfully tested for corrosion resistance include an extensive list of acids, salts, bases, and organic materials under varied atmospheric and temperature conditions.

Four-Eighty-Four Duplex Polishing Machine

As a result of a demand for a fast machine capable of producing a quality finish on small cylindrical work, the Four-Eighty-Four Duplex Polishing Machine has been developed by The Production Machine Co., Greenfield, Mass. Equipped with two polishing heads, the machine employs the use of abrasive, felt, leather, or fabric belts, depending on the finish desired.

Having a capacity up to 1½-inch diameter, the machine will perform a two-pass polishing operation on metal, wood, fiber, plastic, fiber-glass, and many other materials within its weight limitations. Only a single handling of material is required, and many parts may be fed to the machine automatically by means of hoppers or fixtures suitable for the individual application.



Four-Eighty-Four Duplex Polishing Machine

WANTED!

5,000 METAL FINISHERS

to try the improved DETROIT HANDY "TAC" RAG on all surfaces before applying varnish, lacquer or synthetic enamel. They're non-inflammable at no extra cost, ready for instant use, never dry out or harden. *Standard* of your Finishing Industry for 16 years. Ask your supplier today or send for sample.

DETROIT HANDY "TAC" RAG

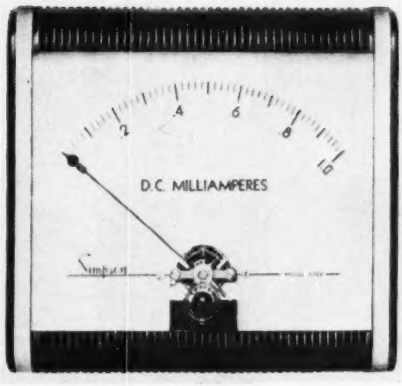
DETRO MFG. & SALES CO., INC., CULVER CITY, CALIF.

Panel Instruments

The Simpson Electric Co., 5200 W. Kinzie St., Chicago 44, Ill., is producing a line of modernistic electrical recording and testing panel instruments in three different sizes. Classified as Model Nos. 1029, 1027, and 1127 and available in 4½, 3½, and 2½-inch sizes, the design is identical on all three of the panel-type meters.

The large, easy-to-read scale provides greater readability under all light conditions. The etched faces extend across the entire front of the meter and are protected with unbreakable plastic. Vertical chrome-plated strips are recessed into the plastic, fluted cover.

According to the company, the special, open-scale layout permits the use of the customer's name, trademark, or effective



Simpson Model 1029 Panel D.C. Ammeter

color combinations. The instruments are said to embody new ideas in design and engineering so that they can be of maximum value when used with either modern or conventional electrical equipment.

"FO" Maintenance Chemicals

Ten products, designed to cover the major needs of industrial and motor fleet mechanical overhaul and maintenance shops, comprise the line of "FO" chemicals offered by the Aviation-Industrial Chemicals Division of Fine Organics, Inc., 211 E. 19th St., New York 3, New York.

Developed to meet the high quality and performance standards of air transportation maintenance as well as military aviation, the product line is composed of:

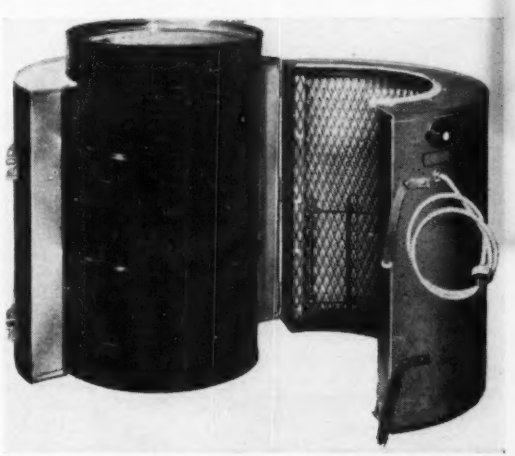
FO-101, Safety Solvent for electric motor cleaning; FO-105, Quaternary ammonium disinfectant; FO-106, Solcent emulsion grease cleaner; FO-108, Liquid detergent—20 per cent soap; FO-109, Waterless cleaner; FO-115, Aluminum and brass polish; FO-116, Cresol emulsion degreaser; FO-120, Paint Stripper; and FO-121, Carburetor and engine parts cleaner.

Palmer Automatic Drum Warmer

The Palmer Drum Warmer is an oven in the form of a portable tool which is adaptable to almost any type of drum heating application. According to the manufacturer, Harold L. Palmer Co., Dept. PF, 6432 Cass Ave., Detroit 2, Mich., users have found it ideal for heating drums overnight for use in the morning; for maintaining required temperature of contents of drums where only a few gallons per hour are removed; as a heating jacket around drums used for mixing small batches at controlled temperatures; for use with mechanical agitator in cold drums of paint enamel, and so on, to better arrive at proper spray gun temperature.

Designed for heavy duty use, each half of the warmer is a semi-circular segment made up of three concentric members of 20 gauge and 16 gauge steel, rigidly joined together. Insulation is a 2-inch thick sheet of Fiberglas; all interior surfaces are spray coated with 600 deg. F. aluminum paint. The unit is 34 inches O.D. and 31½ inches high. It is located one inch above the floor and can be used on wooden floors safely.

According to the company, the temperature controller of the Warmer limits the temperature of the heated air surrounding the drum walls to the dial setting. Average heating time for most materials is about 20 deg. F. rise per hour. There is no overheating. Safe for personnel, it can be maintained easily and simply.



Palmer Automatic Drum Warmer

Hard Gas Carbon Anodes

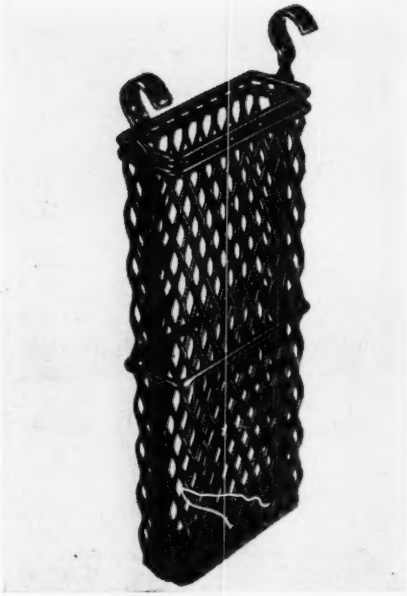
When carbon anodes are required, it is necessary that pure hard gas carbon anodes be used. The carbon anodes made by the Hanson-Van Winkle-Munning Co., Matawan, N. J., are recommended for black nickel solutions operated at room temperature and at relatively high pH. These anodes are hard, and act as ready conductors of both heat and current.

They also are recommended for use in purification when carbon anodes are used. The standard size carbon anode is ⅜ inch thick, 3 or 6 inches wide, and 12, 18 or 24 inches long.

Rubber Insulated Anode Baskets

Automotive Rubber Co., Inc., 8601 Epworth Blvd., Detroit 4, Mich., is offering its line of rubber insulated anode baskets for prolonging production and salvaging butts, sword ends, and pieces of nickel that are normally scrapped.

The baskets have welded steel cores and are completely coated with semi-hard rubber. They suspend from the anode rail, and new anodes are suspended inside the baskets with the scrap packed tightly around them. The baskets are designed to absorb shock and cutting.



Rubber Insulated Anode Basket

FOR SILVERSMITHS, PLATERS, JEWELRY MFGRS., ETC.

Supplied in brass, steel or nickel silver wire in sizes .0025 - .006 or bristle, Nylon or fibre.

Special sizes and shapes to order.

Write us (dep't. P) for catalog and price list.

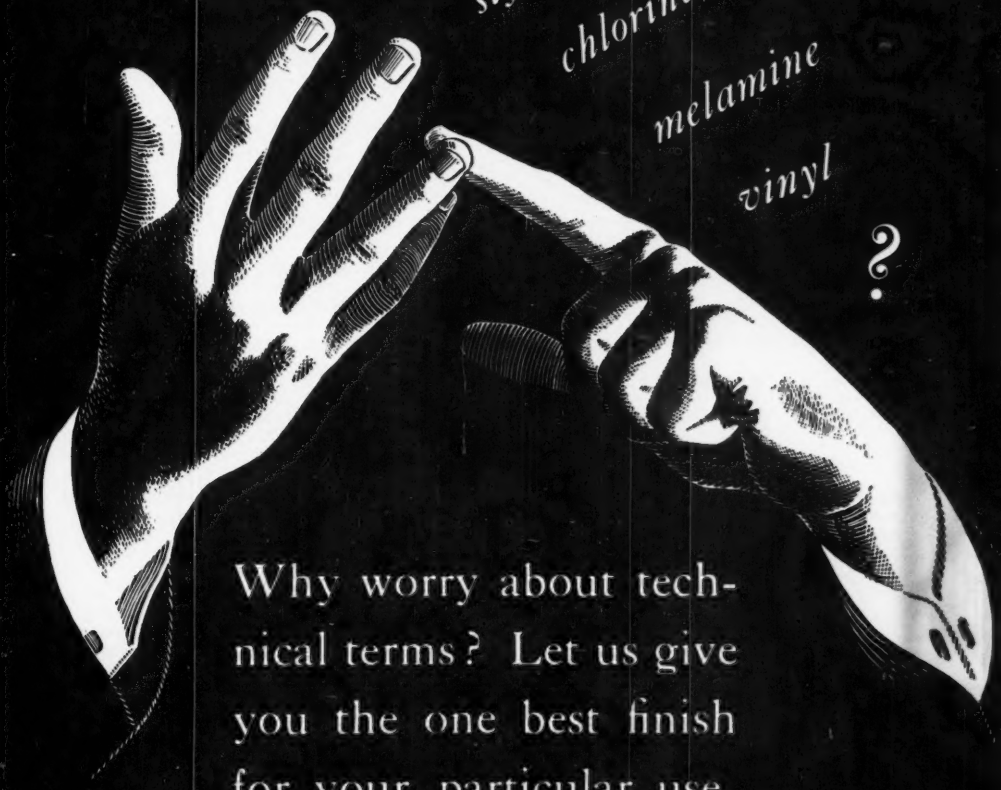
DIXON & RIPPEL, INC. KINGSTON, N. Y.

ESTABLISHED 1856

Reproducible Hammer Finish Attained With One-Coat Method

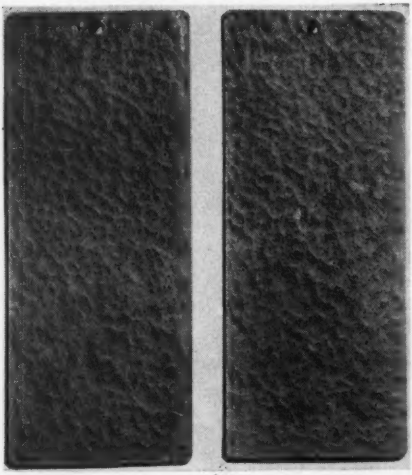
A consistently reproducible hammer finish can be applied to metals with a one-coat spray using Duraplex C-55X and Parlon, it has been established by the Resinous Products Division of Rohm & Haas Co., Philadelphia chemicals manufacturer. Using the formulation below, the method entails careful but not difficult control of spray procedure and conditions.

In the laboratory program just completed, it was found that reproducibility of the hammer pattern is regulated by gun pressure, film thickness, set time and other factors. For best results, the coating should be sprayed at a viscosity of 62 seconds on a No. 4 cup, using a No. 30 DeVilbiss air cap and a pressure of 15 p.s.i. through the feed cup. Atomizing pressure through the spray gun was 50 p.s.i. Tinting pastes, added in extremely small amounts, accentuate the hammer effect. The finish dries tack-free in



Why worry about technical terms? Let us give you the one best finish for your particular use.

PRATT & LAMBERT-INC.
Industrial Finishes
NEW YORK BUFFALO CHICAGO
FORT ERIE, ONT.



To demonstrate the reproducibility of the hammer finish obtainable on metals with a one-coat spray using Duraplex C-55X and Parlon, these panels were sprayed by different operators at an interval of two months.

60 to 90 minutes and shows a Sward rocker hardness of 26 to 30 after a 16-hour dry, the company states.

Variables found to affect the size of the hammered pattern are:

(1) Increasing pressure through the spray gun increases the size of the pattern.
(2) Raising pressure on the feed cup gives a larger pattern and deposits a heavier film.
(3) The more the enamel is atomized as it leaves the spray gun, the less it tends to form a hammered texture. (This adjustment is possibly the most important single factor in gaining uniformity.)
(4) Addition of butanol has an important effect in improving the hammer pattern.
(5) Optimum hammer effect is obtained with a one-mil dry film. Heavier films tend to reduce the hammer texture.
(6) The hammer effect is produced before the finish sets. Therefore, the longer the set time used, the bigger will be the type of texture formed.

Duraplex C-55X is an oxidizing phthalic alkyd resin developed recently to meet the stringent requirements of automotive refinishing work. It is said to contribute fast drying, durability, good gloss and color retention as a paint vehicle.

The formulation:

Material	Pounds
Parlon, 10 centipoise (22.1 per cent solids in High Flash Naphtha	60.5
Duraplex C-55X (70 per cent solids)	37.8
Alcoa Paste No. 1594	2.0
Butanol	2.0
6 per cent cobalt naphthanate	0.24

Physicial Constants	Solids Basis
Parlon	32.1 per cent
Duraplex C-55X	63.4 per cent
Aluminum powder	4.5 per cent
Total solids	41.0 per cent

Improved Anode Hooks

Division Lead Co., 830 W. Kinzie St., Chicago 22, Ill., has adopted a corrosion-proof plastic coating called "Black Armour" to protect its Divco anode hooks from chromic acid fumes, drag-out drippings, and spray.

The coating, it is claimed, adds materially to the service life of these high-conductivity copper hooks, making them last several times longer. Increased ease of handling is another feature.

YOUNG BROTHERS OVENS
for baking and drying

Designed and built to produce the finest results in baking processes such as PAINT FINISHING, METAL DECORATING, INSULATION BAKING. Batch or Conveyor Types for any fuel. Write for Bulletin 3.

YOUNG BROTHERS CO.
1837 Columbus Rd. *Estab. 1896* Cleveland 13, O.

The NEW 60 Series MURRAY-WAY HEAD!

ECONOMICAL
VERSATILE
COMPACT

Here is a head, so compact it can operate on 30" centers—extremely versatile in use and positioning. It will save you many valuable feet of floor space and thousands of dollars in expenditure on smaller table diameters and costly conveyors and fixtures.

The same head may be used either right or left handed, without extra brackets or extensive mechanical adjustment. A quick, simple changeover can be easily made. Special pneumatic controls automatically assure constant, accurate work pressure.

This new head will be available in two models. The #61 rated at 10 to 15 H. P. and the #62 rated at 5 to 7½ H. P. Both carry the outstanding engineering features which have made Murray-Way equipment the finest in the field.

3 Year Spindle Guarantee!

Again Murray-Way takes the lead with this assured quality protection.

Write for our catalog of automatic polishing—buffing—grinding equipment.

MURRAY WAY

THE MURRAY-WAY CORPORATION

3925 WEST FORT STREET • DETROIT 16, MICHIGAN

AUTOMATIC POLISHING, BUFFING, GRINDING EQUIPMENT

"Leabrament" and "Leament"

The Lea Mfg. Co., Waterbury, Conn., manufacturer of polishing and buffing compounds and platers' supplies, announces the following products:

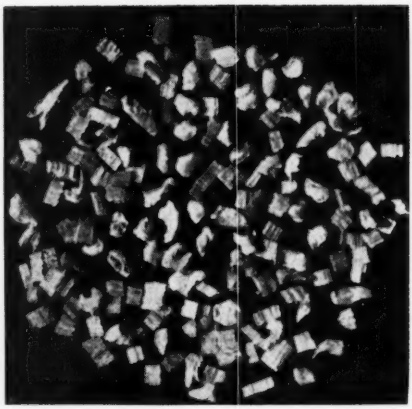
Leabrament, a greaseless, non-flammable, quick drying, liquid abrasive, for burring and polishing, available in grit sizes from 100 to fine micron. It can be sprayed or brushed on polishing and buffing wheels and is suitable for hand or automatic production methods. It is also suitable for renewing worn abrasive belts, it is stated.

Leament, a liquid polishing cement featured by flexibility and long life. It can be sprayed or brushed on the wheel prior to heading up with loose abrasives.

Sawdust-Corn Cob Barrel Polishing Compound

Kube-Kut, Inc., 625 Midland Ave., Garfield, N. J., announces a barrel polishing medium, "Korn-Kube" for all metals, plastics, rubber, wood, glass, and other materials. The compound is composed of hardwood (maple) in cube form and dried, to which is added macerated corn cobs. Both materials are thoroughly screened and aspirated to remove dust, and the mixture combines the high absorption of the sawdust with the tough polishing action of the pulverized corn cobs.

"Korn-Kube" permits drying and polishing of metals, plastics, rubber, wood, glass and other materials, irrespective of size, as long as it can be handled by tumbling barrels in a minimum of time. Several mixtures and particle sizes are available to meet specific conditions.



Barrel Polishing Compound

Hose for Hot Spray Finishing

A flexible hose which is reported to give exceptional service with hot spray lacquers is being offered by Resistoflex Corp., Belleville 9, N. J. Constructed with a tube of compar, which has outstanding resistance to the various strong solvents used in lacquers, synthetic coatings and enamels, it is claimed that it will not swell in contact with aromatic hydrocarbons, esters, ketones and chlorinated solvents,

In addition to the compar tube, Resistoflex industrial finishing hose is claimed to have high tensile yarn reinforcing braids. Its synthetic cover is lead-mold cured, which is said to increase toughness and abrasion resistance of the rubber. The hose is built in ¼, $\frac{5}{16}$, ⅜, and ½ inch diameters and is dimensionally suited for use with the reusable couplings on conventional spray equipment.

BOOTHCOTE

cleans spray booths quickly, economically, safely!

Spray Boothcote on clean booth. Surplus paint can then be peeled off in sheets by any operator.

- Saves time and labor
- Time-tested; used for 11 years
- Mixed—ready to use

- Can be brushed or sprayed
- Non-inflammable; safe to store
- Does not flake off

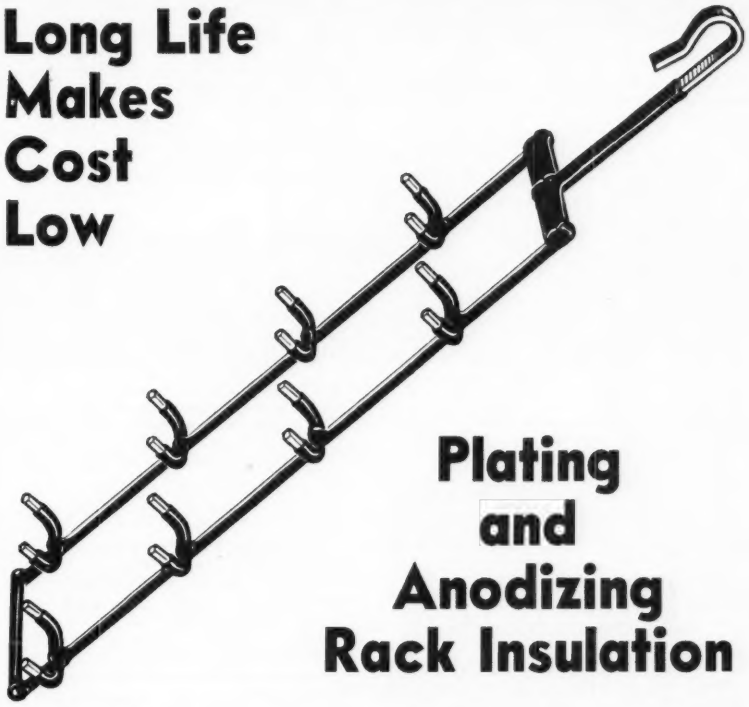
Money back trial offers: 5 gals. $6.25 f.o.b. Buffalo or write for Circular.

Distributors! Write for open territories.

HYGRADE FOOD PRODUCTS CORP.

Boothcote Div., 19 Stetson St., Buffalo 6, N. Y.

Long Life Makes Cost Low



Plating and Anodizing Rack Insulation

BUNATOL No. 1002 Paste rack insulation will last for thousands of cycles through the Plating or Anodizing tanks. Such rugged insulation life coupled with very low first cost is what makes the use of No. 1002 an investment instead of an expense. No. 1002 is a 100% solids insulation without evaporation loss or waste. The high gloss and extremely tough insulation will withstand cuts and abrasion and rinses cleanly so as not to carry over solutions. Requires only a single Primer coat which will give extra strong adhesion to hold the insulation to the rack. So simple to use—complete insulation operation in two to three hours. That means quick service and low labor cost. Investigate the savings possible by insulating your own racks with BUNATOL. A note on your letterhead will bring complete information.

NELSON J. QUINN COMPANY TOLEDO 7, OHIO

— for 15 years —

Rack Insulation Exclusively

PRODUCT LITERATURE

The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning PRODUCTS FINISHING when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.

"Regeneration of Chromic Acid Solutions by Cation Exchange" is the title of an informative reprint, Serial No. 65, available from the Mutual Chemical Company of America, 270 Madison Ave., New York 16, New York.

"Report on a Study of the Hot-Spray Application of Lacquer," a 20-page booklet, is a summary of tests performed on the hot-spray process in the laboratories of the Hercules Powder Co., Cellulose Products Dept., 927 Market St., Wilmington, Del. Many tables and charts are included.

HOLLAND SAYS:
START SAVING BY INCREASING PRODUCTION
Spray Booth — Leg and Floor Type. Available in all sizes.
Write for FREE folder "M" showing our wide selection of metal finishing equipment.
J. HOLLAND & SONS, INC.
MANUFACTURERS • DEALERS
276 SOUTH NINTH ST. • BROOKLYN, N. Y.

Robinson Exhauster Fan. Robinson Ventilating Co., Zelienople, Pa., has published **Bulletin No. 5100** which contains illustrations and descriptions of its Type AE Exhauster Fan for dust exhaust systems, smoke and fume exhaust systems, recirculating systems for heat treating furnaces, and annealing ovens. In addition, many capacity tables are included.

Enthone Strippers for Organic Finishes. Enthone, Inc., Dept. PF, 442 Elm St., New Haven, Conn., has prepared a four-page illustrated booklet describing various strippers for removal of synthetic organic coatings from metals, including lacquers, enamels, and varnishes. Strippers described include room temperature fast evaporating strippers, emulsion type materials that are mixed with water and are used both at room temperature and heated, and brush-on type strippers.

"Specification Chemicals for the Government and Its Contractors" is the title of a very compact specification card available from the American Chemical Paint Co., Ambler, Pa. The handy card contains classified groups of ACP specification chemicals together with the Government Specifications Number assigned to each product. The materials listed are classified as phosphatizing, rust proofing and paint bonding chemicals, rust removing and metal conditioning chemicals, metal cleaning chemicals, and acid inhibitors for pickling.

The card also contains an alphabetical list of metals normally requiring surface treatment, and recommended products supplied by the company for cleaning and treating each metal listed.

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FLEXIBLE SHAFT MACHINES ARE **rugged** AND GIVE TOP PERFORMANCE!...

Investing in equipment demands selecting rugged, long-lasting machines that give top performance. You get both when you buy STRAND Flexible Shaft Equipment. The STRAND line is complete and meets requirements. You'll find available the correct machine with correct H. P., a choice of R. P. M., belt drive or direct drive, varied mountings and many other features you may require.

STRAND equipment enjoys an enviable reputation for quality . . . you can buy it with confidence. It is sold through distributors in major cities.

Illustration shows STRANDFLEX 4-Speed Gear Drive Machine

The Balmar Corporation
N. A. STRAND DIVISION
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3001 N. Walcott
Chicago 40

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FLEXIBLE SHAFTS
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SALES OFFICES: CHICAGO, BALTIMORE and TULSA

"Buffalo" Axial Flow Fans. The latest information on Buffalo Type "B" Vaneaxial and Tubeaxial Fans for use on paint spray booth exhausts is contained in **Bulletin 3533-D,** available from the Buffalo Forge Co., 536 Broadway, Buffalo 5, New York.

Air Foam Equipment. A brochure on air foam or mechanical foam for fire fighting has been released by the Pyrene Manufacturing Co., 11 Empire St., Newark, N. J., and is available on request to companies having oil storage tanks and other large flammable liquid fire hazards.

Twenty-four pages and well illustrated, the booklet describes air foam, methods of application, high and low expansion types of foam compound, specifications and operating characteristics for five sizes of portable playpipes, mobile and stationary foam proportioning tanks and installations of the auto induction pressure line inductor, "around-the-pump" proportioner, self-contained and motor fire apparatus types. A selector valve for use with wetting agent and foam compound carried on motor fire apparatus is also shown.

PAINT MIXER

MIRACLE
5 GALLON
PAINT REJUVENATOR
All paint restored to original consistency without opening the can.
2 minutes per gallon.
MIRACLE PAINT REJUVENATOR CO.
128 E. 10th St., St. Paul 1

Write for Catalog of
PAINT TESTING APPARATUS
GARDNER LABORATORY
Bethesda 14, Md.

"Surface Active Agents and Organic Chemical Specialties" is the title of an eight-page catalog released by the Alrose Chemical Co., Providence 1, R. I. New products listed are the Alrolenes, Alrosept MBC-50, Alromine RA, Alrowax 75, Alrodynes, Alrowet CA, Alrosperse 40 K.

The Dow Chemical Company announces the availability of a catalogue on **Saran Lined Steel Pipe, Fittings, and Valves.** Saran, a Dow plastic, noted for its resistance to most chemicals, oils and solvents, is used in connection with corrosive services.

The catalogue, which is available from the Saran Lined Pipe Co., 2415 Burdette Ave., Ferndale 20, Mich., deals with the properties and fabrication of Saran lined steel pipe, fittings, and valves. Photographs, cross-section and dimensional drawings are also included.

Mahon Industrial Equipment. The R. C. Mahon Co., Detroit 34, Mich., has prepared a 12-page liberally illustrated booklet which describes modern equipment supplied by the company. Designated as Catalog No. A-650, equipment listed includes: complete finishing systems for porcelain enamel, synthetic enamel, lacquer, paint, varnish, and japan finishing; metal cleaning and pickling; metal cleaning and rust proofing; dry-off ovens and cooling tunnels; Hydro-Filter spray booths; flow and dip coaters; automatic sludge segregators and unloaders; filter air supply systems; drying and baking ovens; core and mold baking ovens; Hydro-Foam dust collectors and fog filters; steel conveyor racks and adapters; steel hoppers, tanks, and pressure vessels; and many other units for special production.

CORROSION-PROOF PROCESSING TANKS
- Corrosion-proof construction of processing and storage tanks; industrial flooring.
- Experience serving major steel, chemical, textile and food plants.
- Complete Facilities: Design; Engineering; Material; Construction; Maintenance.

Write for bulletin giving complete details

CHEMSTEEL CONSTRUCTION COMPANY, INC.
301 Chemsteel Building, Walnut Street, Pittsburgh 32, Pa.

Your product is a *football!*

It's apt to get kicked around . . . thrown . . . dropped. That's one reason why . . . like a football . . . its "cover" is important. Whether your "cover" coats air or heirlooms, it's one factor that enables your product to stand up . . . that keeps you in the game.

A durable "cover" by Stanley does just that, because our chemists work hand-in-hand with your design engineers to discover the specific finish to do the specific job: that is, make your product look better and last longer.

Our emphasis at Stanley on "special finishes for special applications" has already helped many manufacturers to build sales. We'd like to help build yours. Write us about your finishing needs today: The Stanley Chemical Company, East Berlin. Connecticut.

STANLEY

Industrial Coatings

STANLEY CHEMICAL

LACQUERS SYNTHETICS JAPANS ENAMELS

U. S. Industrial Gloves. The many styles and uses of its Neoprene, canvas, and net-lined gloves and mittens are described and illustrated in a folder issued by the U. S. Rubber Co., P. O. Box 1453, Providence, Rhode Island.

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pH and Chemical Control Equipment. Hartman-Leddon Co., Inc., 5831 Market St., Philadelphia 39, Pa., has available the eighth edition of **Section C** of its catalog. The 75-page book describes a large variety of indicators, buffers, and reference solutions, colorimetric sets, and papers for pH control; volumetric solutions of warranted accuracy, and prepared reagents for many analytical procedures.

"Finishes for Aluminum." The 1950 edition of the 124-page process manual, "Finishes for Aluminum," has been published by Reynolds Metals Co., 2500 S. Third St., Louisville, Ky. Available to engineers, chemists, production men, and others when requested on company letterhead, the new edition is a revision of the book first published in 1947. The 1950 edition not only supplies basic information on the various processes for applying surface finishes to aluminum, but also details the characteristics of the finishes so produced. It includes information on 10 cleaning treatments, 15 mechanical finishes, 16 chemically-produced finishes, 11 electrolytic oxide finshes, organic finishes, and specialized finishes such as luminous paints and vitreous enamels. A section is also included on controls and tests.

Much data are also presented in tabular form, including step-by-step schedules for applying various types of finishes, data on properties and characteristics of the aluminum alloys, action of some chemicals on aluminum alloys, and their relative resistance to corrosion. Included for the first time is a guide for approximating typical costs of applying 20 different treatments to aluminum. Another new table gives typical finishing practices for a wide variety of aluminum products to serve as a suggestion when selecting a finish.

Bearing Balls, Burnishing Materials and Barrel Finishing Equipment. Useful information on deep hardened carbon steel bearing balls, burnishing materials and barrel finishing equipment is contained in its multi-page Catalog-Manual issued by The Abbott Ball Co., 1064 New Britain Ave., Hartford 10, Conn. All information is contained in the book's four sections which include pertinent facts and figures on bearing ball classifications and applications; selection, use and care of burnishing materials; practical barrel finishing, and lithographic plate graining. Tables and charts giving sizes, tolerances, quantities, and shipping weights are also included together with detailed information on Abbott methods of packaging.

Air Compressors and Paint Spray Equipment. Kellogg Division of the American Brake Shoe Co., 93 Humbolt St., Rochester 9, N. Y., has available a catalog which presents in detail its line of air compressors and paint spray equipment. Illustrated throughout by photographs, drawings, charts and tables, the catalog also provides installation and maintenance data in addition to other pertinent information.

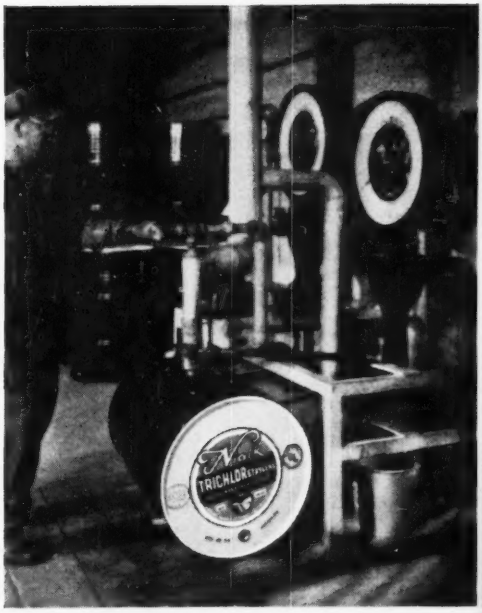
For a real good polishing job use

Keystone TURKISH Emery

FRESH SUPPLY AVAILABLE

KEYSTONE EMERY MILLS *Write for Sample* **4316 Paul St., Phila., Pa.**

metal parts come clean with



NIALK TRICHLORethylene

The cleaner the part, the better the finish . . . one good reason why metal finishers specify NIALK* TRICHLORethylene, the metal-cleaning and degreasing agent of highest quality and stability.

A PAMPHLET containing information on the properties of NIALK TRICHLORethylene is available on request. Just send in the coupon below.

*Trade-Mark

NIAGARA ALKALI COMPANY

60 East 42nd Street, New York 17, New York

FBC Liquid Chlorine*
NIALK Caustic Potash
NIALK Carbonate of Potash
NIALK Paradichlorobenzene
NIALK Caustic Soda
NIAGATHAL (Tetrachloro Phthalic Anhydride)*
NIALK TRICHLORethylene

Niagara Alkali Company, Dept. H
60 East 42nd Street, New York 17, N. Y.

Gentlemen: Please send me a copy of your pamphlet on NIALK TRICHLORethylene.

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Flexible Shaft Machines. Catalog 31, now available from The Balmar Corp., N. A. Strand Div., 5001 N. Wolcott, Chicago 40, Ill., contains illustrated, descriptive, and tabular information on various types of flexible shaft machines for a wide variety of operations, including grinding, buffing, polishing, sanding, drilling, reaming, rotary filing, wire brushing, nut setting, rasping, and so on. Also described and illustrated are flexible shaft cores and casings, spindles, handpieces, angular attachments, chucks, sanding drums, couplings, and various other tools and attachments.

Rubber Insulated Anode Baskets. Price lists and **Bulletin No. 100,** which completely describes Rubber Insulated Anode Baskets and their use, can be obtained from the Automotive Rubber Co., Inc., 8601 Epworth Blvd., Detroit 4, Michigan.

"Products of Atlas" is the title of a 20-page booklet prepared by the Atlas Powder Co., Wilmington 99, Del., which lists and describes such items as industrial chemicals, industrial finishes, and activated carbons.

Burnishing Machine. A new development for wet ball burnishing and polishing—the completely automatic Tumb-L-Dur Burnishing machine—is covered in **Bulletin No. TDB-50,** issued by Lupomatic Industries, Inc., 4510 Bullard Ave., New York 66, N. Y. The bulletin contains complete specifications for Tumb-L-Matic's standard UP line, which may also be equipped with fabricated Tumb-L-Dur barrels. Model numbers, tumbler sizes, and capacities are given.

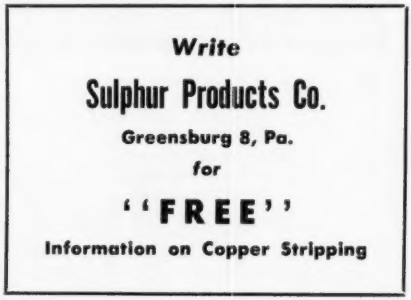
Circo Hot Vapor Degreasers. Cub, Chief and Clipper, and Models SC-43 and SC-91 Hot Vapor Degreasers, made of stainless steel with automatic controls, are described and illustrated in **Catalog Pages 37115A, 37116,** and **37001A,** issued by Circo Products Co., 6531 Euclid Ave., Cleveland 3, Ohio. Specifications are given and the many features cited.

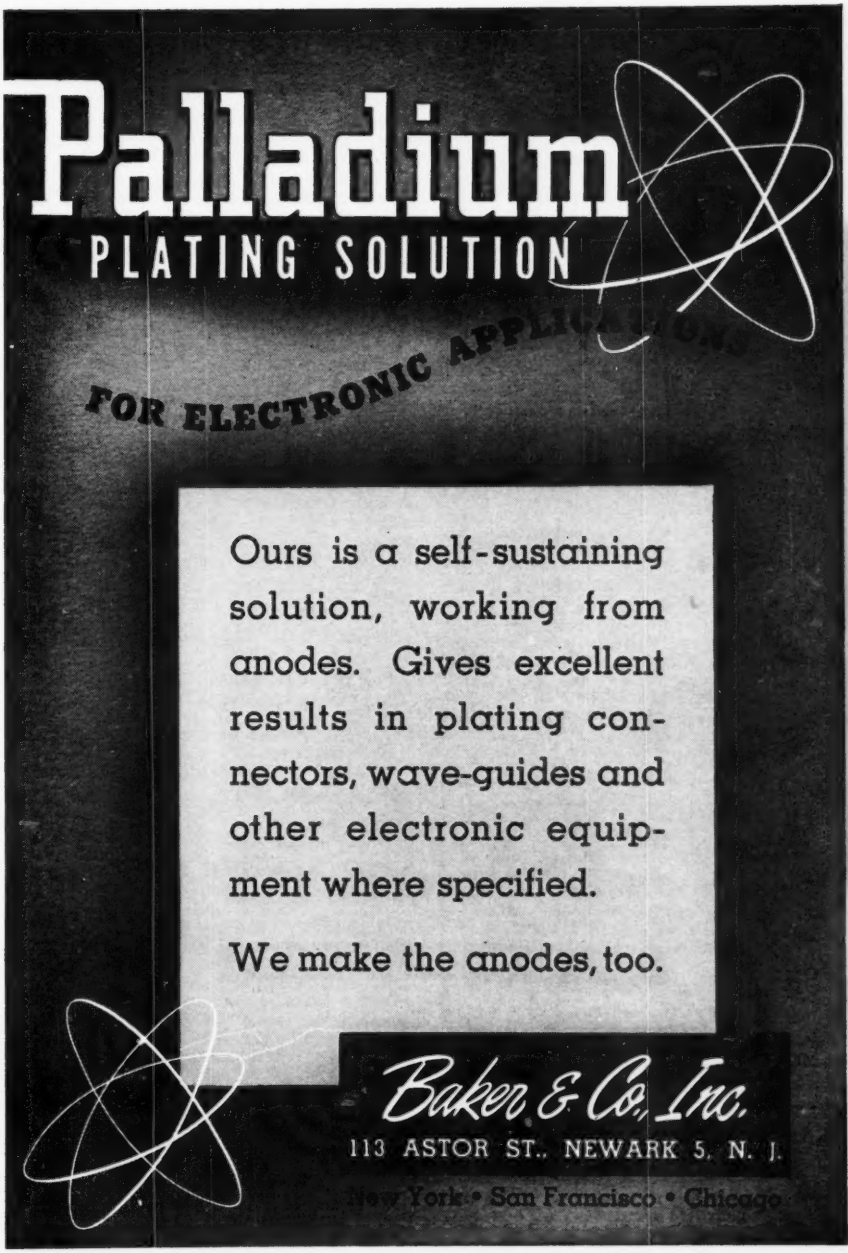
Touch-Up "Granodine." American Chemical Paint Co., Ambler, Pa., has issued **Technical Service Data Sheet No. 7-13-50-3** which describes in detail Touch-Up "Granodine" which is used in a simple and portable process for anchoring paint to cold-rolled steel products, including new work or repaired surfaces of old work.

Brake Shoe Micro-Spray Gun. Characteristics, features, application, and advantages of this spray gun are set forth in a four-page bulletin released by the Kellogg Div., American Brake Shoe Co., 93 Humboldt St., Rochester 9, N. Y. Illustrations are included, together with descriptions of spray equipment accessories.

Udylite Automatic Plating Machines. The Udylite Corp., Detroit 11, Mich., has published a 12-page, two-color booklet illustrating the Udylite Full Automatics, single-row, double-row, overhead return-type, rotary and other models, as well as the Udylite Junior and the Udylite Semi-Automatic. Brief descriptions of these units are given along with an outline of the Udylite service policy and pertinent information concerning the construction of Udylite plating machines.

YOUR SALES ZOOM!!!
MAN-HOURS CUT IN HALF
WHEN YOU USE
SCHAFFNER'S LIME FINISH OR GREASE STICK
Schaffner Mfg. Co., Inc. Emsworth, Pittsburgh 2, Pa. Rosewood 1-9902

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PLATING SOLUTION
FOR ELECTRONIC APPLICATIONS
Ours is a self-sustaining solution, working from anodes. Gives excellent results in plating connectors, wave-guides and other electronic equipment where specified.
We make the anodes, too.
Baker & Co., Inc.
113 ASTOR ST., NEWARK 5, N. J.
New York • San Francisco • Chicago

Pylumin Process. Pyrene Manufacturing Co., Metal Finishing Div., 10 Empire St., Newark 5, N. J., has available an eight-page well illustrated booklet describing its Pylumin Process, which provides a simple and rapid method of producing satisfactory paint base coatings on aluminum and aluminum alloys.

Pfaudler Chromic Acid Recovery System. Several pages of instructions on chromic acid recovery, including a schematic drawing and a chart showing the corrosive effects of different materials, can be obtained from The Pfaudler Co., 1000 West Ave., Rochester 3, New York.

Strip-Chart Dynamaster Electronic Instruments. Bulletin No. W1821 describing the company's line of Series 500 Strip-Chart Dynamaster Electronic Instruments has been published by The Bristol Co., 108 Bristol Rd., Waterbury 91, Conn. Liberally illustrated with photos of various models, reproduction of chart records, and schematic drawings, the bulletin gives information concerning the instruments for recording and indicating such variables as temperature, resistance, conductivity, strain, position, inductance, pressure, and force. In addition to the recording models, pneumatic and electric-operated automatic control models are also described.

GOLD PLATING SOLUTIONS
In All Colors
Guaranteed 100% Pure Gold Content
Troy Weight - Color Constant
Tarnish Resistant
Proven Quality by the Acid Test
Write or call our experts about your plating problems
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54 West 22nd St., New York 10, N. Y.
Oregon 5-0094
5-0095

Prepaint Cleaner. How a prepaint metal-cleaning material, Oakite Compound No. 33, performs three jobs in one operation is discussed in a special booklet issued by Oakite Products, Inc., 120 Thames St., New York 6, N. Y. The booklet describes how Oakite Compound No. 33, used in tanks or by hand, (1) removes oil, (2) removes rust, and (3) prepares metal for excellent paint adhesion in a single operation.

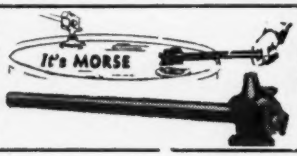
Kold Grip Polishing Cement. Park Chemical Co., 8074-8110 Military Ave., Detroit, Mich., has available **Bulletin Nos. C-2, C-3, C-4,** and **C-5** which describe in detail Kold Grip Polishing Cement, its applications, and advantages.

The Sward Hardness Rocker with leveling table, panel holder, and cellulose shield, which indicates hardness by the number of oscillations or swings it makes, is fully covered in a four-page leaflet obtainable from Henry A. Gardner Laboratory, Inc., Bethesda 14, Maryland.

Sarcostat Hydaulic Motor Valve. Sarco Co., Inc., Dept. 54, Empire State Bldg., New York 1, N. Y., has issued **Bulletin No. 1080-A** which contains cross-sectional drawings, capacity charts, detailed information, and prices on its Type O Hydraulic Motor Valve.

U. S. Government Procurement. Trilane Associates, Inc., 1 Hudson St., New York 13, N. Y., has published a new United States Government Procurement Brochure, designed as an aid to manufacturers in obtaining Government business and filled with accurate, up-to-the-minute information relative to Government purchasing. All aspects of the procurement picture are thoroughly covered in the attractive 16-page brochure.

Send NOW for this FIT-ALL
DRUM PLUG WRENCH
Instantly loosens, tightens 95% all plugs or bungs in steel drums. Has 16" extra-strong steel tubing handle. Wgt. only 2 lbs. Order 1 or more today!



THOUSANDS IN USE saving time, labor, accidents!
SATISFACTION GUARANTEED... **$2.60**
Non-sparking type $4.00
Plus Parcel Post
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125 Dickerson, Syracuse 2, N.Y.

Opportunity Section

FOR SALE: Blakeslee Degreaser, Type DB, Gas Fired, I. D., 10' x 3' x 5', with Pressure Spray System, Excellent Condition. Write Box No. 112, c/o PRODUCTS FINISHING, 431 Main Street, Cincinnati 2, Ohio.

FOR SALE

1045 gallons or any part Forbes 1602-A Black Semi-Gloss Satin Enamel , synthetic hi-grade. Recommended baking time 30 minutes at 300°F. Priced well. Write Allied Engineering & Equipment Co., 828 N. Broadway, Milwaukee 2, Wis.

For Sale: One fully equipped La-Salco automatic plating machine, never used. Can be used for nickel-chrome and nickel-brass. Write Box No. 111, c/o PRODUCTS FINISHING, 431 Main Street, Cincinnati 2, Ohio.

This Opportunity Section is available for classified advertisements. For advertising rates and other information address:

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NICKEL ANODES ... *10,000 lbs.*

For Sale

Subject to prior sale

WRITE P. O. Box 291, UPPER DARBY, PA.

PAINT STRIPPING

We remove Baked, Air-dried, Plastic and all other finishes from all metals or glass. Send sample of your product for cost estimate, or write:

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CHLORINATED SOLVENTS
Also Other Materials

CHEMICAL SERVICE CORP.

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Phone HAnover 2-6970

Chemical Construction Materials. Atlas Mineral Products Co., 42 Walnut St., Mertztown, Pa., has published its **General Bulletin MCC No. 1** which briefly describes its complete line of chemical construction materials, including: corrosin-proof linings, corrosion-proof cements, acid-proof brick and tile, corrosion-proof brick sheathings, corrosion-proof protective coatings and corrosion-proof floors. It also includes handy estimating data.

Prologue to Tomorrow. By Robert Keith Leavitt. Published by The Pennsylvania Salt Manufacturing Co., 1000 Widener Bldg., Philadelphia 7, Pa. 100 pages. Illustrated.

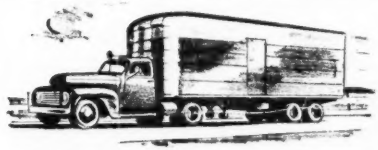
"Prologue to Tomorrow" is a history of the first hundred years in the life of The Pennsylvania Salt Manufacturing Company. Issued as a commemoration of the company's centennial, the book interestingly records Pennsalt's years of growth.

The Finishing Touch — *By J. A. Patterson*

"Yeah, this baby's shot. Hapgood should be back from the stock room with a new polishing wheel any minute!!"

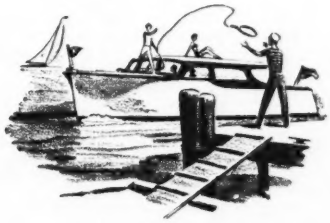
How Production-Wise Manufacturers

SAVE SANDING COSTS



ON LAND

The gleaming stainless steel that makes up these modern truck trailer bodies is polished with BONDITE* Jewelox paper belts. Because they cut faster, last longer, Jewel Abrasive Belts can roll up sanding savings for you!



ON THE SEA

Torn covers on drum sanders were causing costly slow-downs in finishing plywood sheets for this boat builder. AP Sales Engineer recommended change to super-tough Jewel Bondex Garnet Fibre. Builder reports, "These Jewel drum covers are the best ever!

Moisture repellent and heat resistant.

Whatever your product, chances are you can cut costs — do better work like this — with Jewel Coated Abrasives. See your distributor or write us now!

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BELTS

DISKS

SHEETS

SPECIAL SHAPES

Cloth, Paper, Fibre or Combination Backing

BUY THROUGH YOUR INDUSTRIAL DISTRIBUTOR

"Tomorrow's Finishes . . . Today" is the title of a 12-page booklet available from U. S. Industrial Chemicals, Inc., 60 E. 42nd St., New York 17, N. Y. Attractively prepared, the booklet describes ten resins which are all recent U.S.I. developments.

Rust Control. Protection against rust for metal parts during manufacturing, in storage and in transit, is discussed in a four-page bulletin offered by Nox-Rust Chemical Corp., 2423 S. Halsted St., Chicago 8, Ill. The bulletin covers the company's Nox-Rust 310-AC which removes fingerprints and deposits a thin, transparent film. Application is made by brushing, spraying, or dipping at room temperatures.

"Lucite" Chemical and Plating Equipment. Singleton Co., 9823 Lorain Ave., Cleveland, Ohio, has released **Singleton Bulletin G-1** which illustrates and lists the features of its complete line of Lucite plating range cells, laboratory and production tanks, liners, baskets, buckets, trays, plating cylinders, and miscellaneous items.

Catalogs

FOR YOUR LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Metal Cleaners

Bulletins on cleaners for zinc base die castings, aluminum (both etching and non-etching types), steel, brass, tin, and lead alloys are available from Enthone, Inc., New Haven, Conneticut.

2. Acid-Proof Construction

A catalog discussing its complete facilities for designing, engineering, material selection, erection and maintenance of acid-proof construction for all industries is available from Chemsteel Construction Co., Inc., Pittsburgh, Pennsylvania.

3. Black Finishes

A "Black Book" describing details of Zinc Black and other Black-Magic metal finishes has been published by the Mitchell-Bradford Chemical Co., Stratford, Bridgeport, Connecticut.

4. Tanks

Tanks for all types of electroplating, pickling, cleaning, rinsing, and similar treatments are covered throughly in Bulletin No. T-105 issued by the Hanson-Van Winkle-Munning Co., Matawan, New Jersey.

5. Plating Rack Paste Insulation

The Nelson J. Quinn Co., Toledo 7, Ohio, has available a folder descriptive of Bunatol 1002, a paste insulation designed to insulate hooks, fixtures, jigs, baskets, grids, and racks used in plating, its application and use.

6. Backstand Belts

"Facts About Backstand-Belt Grinding and Polishing" are enumerated in a booklet being distributed by Armour & Co., Chicago 9, Illinois.

7. Polishing Cement

Kold Grip Polishing Cements, improved adhesives for polishing wheels, are described and illustrated in a bulletin prepared by the Park Chemical Co., Detroit, Michigan.

8. Grinding and Polishing Equipment

Specifications and operating data of its complete line of grinders, polishers, buffers, and speed lathes are included in Catalog No. 44 prepared by the Standard Electrical Tool Co., Cincinnati 4, Ohio.

9. Infra-Red Ovens

The Fostoria Pressed Steel Corp., Fostoria, Ohio, has prepared Bulletin EV-M149-10 which presents in detail advantages to be gained through the use of Fostoria "Evenray" Heating Equipment. The ovens are described feature by feature, and characteristics of the equipment are outlined.

10. Scratch Brushes

Dixrip Fine Wire Scratch Brushes for all industrial purposes are described and illustrated in a catalog and price list available from Dixon & Rippel, Inc., Kingston, New York.

11. Gold Plating

An instruction booklet describing gold coloring solutions for various shades of gold is now being issued by Baker & Co., Inc., Newark, New Jersey.

12. Felt Polishing Wheels and Accessories

Bacon Felt Co., Winchester, Mass., has an illustrated brochure listing its complete line of felt polishing wheels, bobs, sheets, hair felt, and marble buffers, together with specifications and suggested applications.

13. General Purpose Fans

"General Purpose Fans" is the title of an eight-page bulletin designated as Bulletin 491 distributed by the New York Blower Co., Chicago 16, Illinois.

14. Axial Flow Fans

Bulletin 3533-D, containing latest data on Buffalo Type "B" Vaneaxial and Tubeaxial Fans for use on paint spray booth exhausts, can be obtained from the Buffalo Forge Co., Buffalo, New York.

15. Metal Lacquers

"Is There A Better Metal Finish Than The One You Now Use?" is a booklet issued by The Egyptian Lacquer Mfg. Co., Newark, N. J., describing six clear lacquers for metal.

16. Chemifinishes

General information concerning the finishing of metals with Du-Lite materials is contained in literature prepared by The Du-Lite Chemical Corp., Middletown, Connecticut.

17. Electric Heating Units and Equipment
Prepared by the Edwin L. Wiegand Co., Pittsburgh, Pa., Catalog 50 lists a wide variety of standard electric heating units and equipment, together with easy selection and application data.

18. Temperature Controls
Self-operated temperature controls for plating and finishing applications are described in Catalog No. 600 available from the Sarco Co., Inc., New York 1, New York.

19. Deburring and Finishing Equipment
"Cut Labor Costs ½ or More" is the title of a bulletin issued by Almco, Division of Queen Stove Works, Inc., Albert Lea, Minn., describing the complete line of Supersheen deburring and finishing barrels, equipment, and supplies.

20. Striplastic No. 320
A bulletin describing the properties and applications of Striplastic No. 320 is available from the Striplastic Co., Cleveland 6, Ohio.

21. Flexible Shaft Machines
Catalog 31, now available from The Balmar Corp., N. A. Strand Div., Chicago, Ill., contains illustrated, descriptive, and tabular information on various types of flexible shaft machines for a wide variety of operations.

22. Paint Heater
Bede Products Inc., Cleveland 9, Ohio, has prepared a four-page illustrated circular describing operating characteristics, and advantages of its Paint and Air Heater for use in the hot spray process for lacquers and other organic finishes.

23. Finishing Equipment
The Despatch Oven Co., Minneapolis 14, Minn., has prepared Bulletin 51-C which illustrates and describes its complete line of gas-oil, electric, and steam finishing equipment.

24. Iridite Al-Coat
Allied Research Products, Inc., Baltimore, Md., has available a folder describing its Iridite Al-Coat, a chromate type, corrosion-resistant finish for aluminum.

25. Semi-Automatic Polishing and Buffing Machines
Acme Mfg. Co., Detroit, Mich., has available a 20-page two-color bulletin including descriptions and illustrations of its Semi-Automatic Polishing and Buffing Machines, together with line drawings and complete specifications.

26. Cowles SO Cleaner
"Buffing Compound Removal Was A Tough Job!" is the title of a booklet describing the characteristics and advantages of Cowles SO Cleaner, product of Cowles Chemical Co., Cleveland, Ohio.

27. Infra-Red Lamps
"Drying Problems Made Easy," an eight-page bulletin prepared by the North American Electric Lamp Co., St. Louis 6, Mo., discusses important uses for Nalco Infra-Red Lamps, and illustrates and describes the company's line of lamps and portable units.

28. Activated Carbon
The use of activated carbon for decolorizing, purifying, and deodorizing various liquids and electroplating solutions is described in literature available from the Darco Department, Atlas Powder Co., New York 17, New York.

29. Spray Painting Information
"Hints on Finishing Economies," a 20-page booklet prepared by E. I. du Pont de Nemours & Co., Finishes Div., Wilmington 98, Del., covers the following subjects: proper paint temperature, correct air and fluid pressures, importance of paint viscosity, gun adjustment for correct spray pattern, proper handling and triggering of the spray gun, uniformity and thickness of the paint film, and causes and cures of common imperfections in spray finishing.

30. Boothcote Circular
A circular describing the use of Boothcote, a spray booth coating, is available from the Hygrade Food Products Corp., Boothcote Division, Buffalo 6, New York

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431 Main St., Cincinnati 2, Ohio

I am interested in receiving the following literature reviewed in your November Issue.

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(Insert numbers denoting literature you want)

Name ..... Title.....

Company .....

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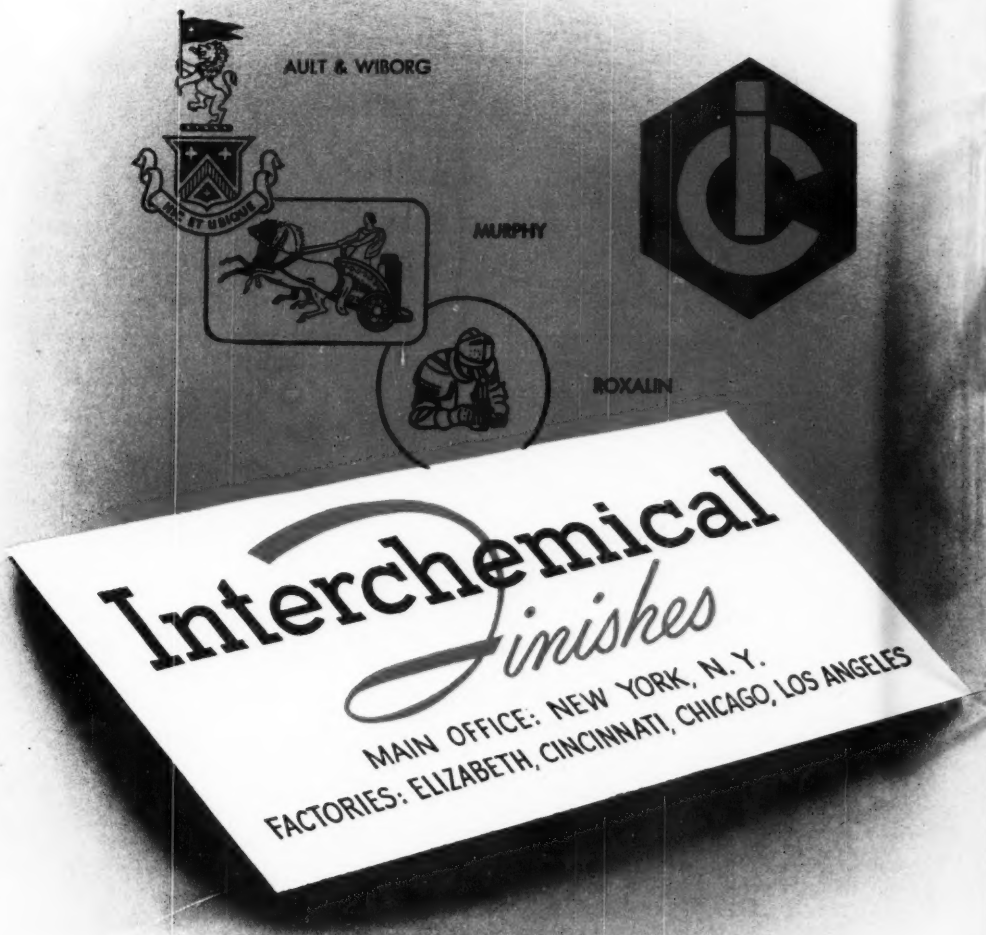

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Plating Superintendent

"Cuts costs with Detrex metal-cleaning compounds."

Purchasing Agent

"Keeps out of trouble with Detrex solvents."

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